

THE INFLUENCE OF MUSIC CONGRUENCE AND MESSAGE COMPLEXITY ON THE RESPONSE OF CONSUMERS TO ADVERTISEMENTS

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ABSTRACT

The overall aim of this study was to examine how the characteristics of two salient stimuli - music and message- of an audio advertisement influence the psychological state of consumers and how such a state subsequently determines their cognitive and affective responses to the advertisement. In achieving this aim, this study was guided by a combination of two cognitive resource utilisation theories, Limited Capacity Model of Motivated Mediated Message Processing (Lang, 2000) and Resource-Matching Hypothesis (Anand & Sternthal, 1989). In particular building upon inconsistency and load theories, this study proposed that certain stimulus characteristics prompted certain states of a consumer's cognition. These two stimulus characteristics were the congruence of musical stimulus and the complexity of the message stimulus. The model then predicted the potential effect of these characteristics on certain psychological states (Psychological Discomfort and Cognitive Load) leading to affective (Attitude towards Advertisement) and cognitive (encoding, storage, and retention) responses.

To empirically examine this model, an online experiment (using a 2 x 2 between-subject x 2 with-in subject mix design) was conducted, in which a mixed sample of 284 subjects was exposed to a set of audio advertisements especially designed for this study. Unfamiliar music in conjunction with a fictitious brand was used and the exposure level was maintained at low. ANCOVA, MANCOVA, two-stage hierarchical regression analysis, and Repeated-measures MANCOVA were administered to test the hypotheses presented in the conceptual model. Among major findings were that the multiple informational structures in a complex message positively influenced cognitive load, while congruent music was capable of attenuating the level of cognitive load. Incongruent music, on the other hand, was capable of generating a dissonance state experienced as psychological discomfort that in turn increased the level of cognitive load as a result of listener's trying to resolve such a state. Both dissonance and cognitive load negatively influenced attitude towards advertisements, and the affect primacy of attitude formation appeared to be more applicable. Though high cognitive load clearly undermines encoding, storage, and retrieval processes, no evidence was found to support the Resource-matching Hypothesis. Furthermore, the findings suggested that the cognitive load offset by the congruent music would increase advertisement effectiveness by enabling its message to carry more information and by generating more favourable attitudes.

DEFINITION OF TERMS

Term	Definition
Advertisement	“...paid, mediated form of communication from an identifiable source, designed to persuade the receiver to take some action, now or in the future.” (Richards & Curran, 2002, p. 74)
Affect	“Momentary pleasant or unpleasant state” (Schimmack & Crites Jr, 2005, p. 397)
Attitude towards Advertisement	The overall degree of favourability towards an advertisement (Ajzen, 2001).
Cognition	“...the internal processors that involves in making sense of the environment...” (Eysenck & Keane, 2010, p. 1) that could be any of a perception, belief, or knowledge (Festinger, 1957) pertaining to an advertisement.
Cognitive Load	The load that performing a particular task impose on cognitive system, mainly on the working memory (Paas & Merriënboer, 1994a), which reflects the cognitive resource pressure perceived by the listener of the advertisement.
Cognitive Resource Pool	The total amount of cognitive resources allocated for carrying out all the processing related to listening to an advertisement (Lang, 2000).
Dissonance	The psychological discomfort state created by the non-fitting relationship between cognitive elements (Festinger, 1957).
Encoding	Extracting information from an advertisement and creating mental representations (Lang, 2000)
Involvement	The level of perceived personal interest evoked with in the experiment situation (Antil, 1984).
Message Complexity	The perception of difficulty in processing and internalising the information carried by the elements or the parts of a given message of an advertisement.
Music	“Music is humanly organized sound, organized with intent into a recognisable aesthetic entity as a musical communication directed from a maker to a known or unforeseen listener, publicly through the medium of

	performer or privately by a performer as a listener” (Godt, 2005, p. 84). Thus, sound effects like heart beat or whistling will not be considered as music.
Music Congruence	The perception of overall appropriateness of music to the message being communicated (Allan, 2006).
Need for Cognition	“...tendency to engage in and enjoy thinking” (Cacioppo & Petty, 1982, p. 116)
Recall	Process of retrieving (Haist, Shimamura, & Squire, 1992) which reflects storage and retrieval (Lang, 2000) of information about specific information of an advertisement.
Recognition	Process of making judgment of whether an item of an advertisement is familiar (Haist et al., 1992), which reflects encoding successfulness (Lang, 2000).
Storage	The process of linking newly encoded information of an advertisement to previously encoded information and/or memory (Lang, 2000).
Working Memory	“A brain system that provides temporary storage and manipulation of the information necessary for such complex cognitive tasks as language comprehension, learning, and reasoning” (A. D. Baddeley, 1992, p. 556)

LIST OF ABBREVIATIONS AND SYMBOLS

Abbreviation / Symbol	Meaning
R^2	Coefficient of determination
d'	d-prime: the recognition sensitivity as per the Signal Detection Framework
f^2	Predictive accuracy
q^2	Predictive relevance
η_P^2	Partial “eta” squared
Δ	Change in value of the accompanied variable
Λ	Wilks’ Lambda
F	Fisher’s F ratio
M	Mean
Mdn	Median
SD	Standard deviation
df	Degrees of freedom
p	Probability value
t	t statistic value
β	Path coefficient
e.g.	For example
i.e.	That is
Sig.	Significant level
ad	Advertisement
ATT	Attitude towards the Advertisement
CLD	Cognitive Load
CPLX	Perceived complexity of the message
CRCE	Perceived music congruence to the message
LC4MP	Limited Capacity Model for Motivated and Mediated Message Processing
PDS	Psychological Discomfort
RM	Resource Matching
WMC	Working Memory Capacity

1 THESIS OVERVIEW

1.1 INTRODUCTION

It is a continuous debate in organisations on how many advertisements to use, at what frequency and at what cost (see. Hargreaves & North, 1997). Organisations continue to rely on advertising although proper answers to these questions are still to be found. Due to its unchallenged significance, the advertising environment has become cluttered and people are exposed to approximately 3,000 advertisement messages every day (Kotler & Armstrong, 2008). Thus, each advertisement's effectiveness in terms of what they communicate and their cost is becoming a significant factor.

Scholars in the area of advertising have been investigating various aspects of advertisements with the intention of making them more effective and avoiding any potential pitfalls in them (Craton & Lantos, 2011). On the other hand, organisations find their marketing communication becoming increasingly lost among the clutter of communication directed at their target audiences through various channels (Speck & Elliott, 1997) which get technologically more advanced daily (North, Hargreaves, & Hargreaves, 2004). Similarly, consumers' inclination to avoid advertisements while maintaining the focus on the primary task/objective is increasing (Cho & Cheon, 2004) placing advertisers in an even more difficult position in making an impact on the consumers with their marketing communication efforts. Hence, it is prudent for the advertisement producers to look for the use of appropriate stimulus contents in an advertisement that will increase its effectiveness in a cost-effective manner (Cho & Cheon, 2004; Ha & McCann, 2008).

Since the first media advertisement broadcast in the 1920's (Kellaris, Cox, & Cox, 1993), organisations have been spending significant amounts of money on advertising, which have been continuously rising over many decades (Plunkett, 2011). In 2014 alone approximately USD 545.40 billion is expected to be spent on advertising worldwide and it is predicted to exceed the USD 600 billion mark in 2016 (eMarketer, 2014a). TV, radio, cinema, and internet advertisements that employed music in most of them accounted for 68% of global advertisement spending while the media (e.g.

newspapers, magazines, and outdoor) claimed 32% of expenditure showing a declining trend (ZenithOptimedia, 2014).

Perspectives of Advertisements

In an attempt to find the place of music and message in an advertisement, it is important to see how researchers and marketers have been conceptually treating an advertisement. Thus this section briefly states the common perspectives of advertisements in general.

An advertisement is a “paid, mediated form of communication from an identifiable source, designed to persuade the receiver to take some action, now or in the future.” (Richards & Curran, 2002, p. 74) and can be viewed from many perspectives. One such common view can be drawn from Dual Processing theories of psychology like the Heuristic-Systematic Model (HSM: Chaiken, 1980) and the Elaboration Likelihood Model (ELM: Petty & Cacioppo, 1986a, 1986b). In this regard, the stimuli of any advertisement have two elements: the central message consisting of the product-related information of an advertisement and peripheral cues used as the executional or nonproduct-based cues. Examples of cues in this category are background music, background picture and colours. Another perspective would be to see it based on the channel being utilised, which is commonly referred to as print media, broadcast media, and new media (e.g. web advertising, social media, blogs). This perspective would see an advertisement from the perspective of the advantages and disadvantages of the preliminary channel in addition to audience reach. From a psychological perspective, advertisements can also be viewed in terms of the modality being used to communicate their message, mainly visual, auditory, or multi-modal (e.g. Jin & Bolebruch, 2009; C. A. Russell, 2002; Tavassoli & Lee, 2003). For instance, print media enables the use of still pictures and colours that utilise the visual modality for processing while radio advertisements are bundled with music and spokespersons that strictly utilise the auditory modality. Hence, these two are mostly *unimodal* in nature. Television, cinema, and web advertisements, on the other hand, are bundled with various visual and auditory stimuli that make such media *multi-modal* (e.g. Jin & Bolebruch, 2009) impacting many facets of consumer psychology. Others (e.g. Rodgers & Thorson, 2012) recognise the effects of advertisements based on many factors such as audience, context, organisations and devices, within which the entire advertising process operates.

Therefore, it is apparent that an advertisement is not a singular entity by nature. In other words, an advertisement is a set of stimuli *bundled* together with the intention of persuading a consumer towards a specific goal that the advertiser has in mind. The impact on the consumer is largely influenced by the salience of the stimuli in this bundle. Therefore it can be said that in a print advertisement, the background picture but not the type of the font used may become salient and influence a consumer. Similarly, background music rather than the gender of the spokesperson becomes salient and would influence the reception of the message in a radio advertisement. In this line of thinking, music and message become the two salient stimuli and the characteristics of each would help to understand the effectiveness of an audio advertisement.

Audio Advertising

An audio advertisement utilises only the auditory stimuli in its communications to the targeted audience and the general definition of an advertisement presented previously will be applicable for audio advertisements as well. Audio advertisements have been generally referred to the radio advertisements mainly due to the characteristic of radio channel (as a media) being similar to that of an audio advertisement. However, radio advertising is a subset of audio advertising. In other words, audio advertising includes the use of different types of media which predominantly use audio, but not restricted to radio advertising. Though radio advertising still plays an important role in advertising in general and specifically with regards to audio advertising (Nielson, 2014b), it is somewhat losing its popularity compared to the other media like TV and New-media. According to Nielson (2014a), approximately 3.9 billion listeners a week were streaming online audio contents in 2014.

With time and changing technologies, the lifestyles of consumers also change and so do the listening habits of consumers (Nielson, 2014c). Compared to the conventional way of listening to the radio in a room or at home in a more attentive fashion, present day broadcast radio listening has become more passive (Nielson, 2014a), and it seems to play the role of an audio wallpaper. However, the advancement of portable audio units such as Apple iPods, Sony Digital Walkman, and smartphones has taken audio listening to a whole new paradigm by empowering the listening habit of people and enabling them to listen to music interactively anywhere they go or with whatever they do (Heye

& Lamont, 2010; North, Hargreaves, et al., 2004). This is more evident in young people wearing headsets in universities, train stations, and on the road (Heye & Lamont, 2010).

This new listening habit opens new channels for advertisers to communicate their audio messages effectively, for instance free-to-air services like YouTube, Pandora, and Spotify catch the attention of the listeners. By the end of 2014, fifty million active users had been recorded with Spotify (Spotify.com, 2014) and the amount of users accessing Pandora was as high as 81.5 million, marking 7% year-on-year growth rate (Pandora.com, 2014). In USA alone the expenditure on digital radio advertising has increased from \$ 0.62 billion to \$ 1.10 billion during the year 2010 to 2014 (eMarketer, 2014b). In addition to the technologically enabled devices, less loaded advertisements in free-internet-radio service has also been an attraction (eMarketer, 2014b).

With these online platforms, the user interaction and engagement with the contents becomes high (ParksAssociates, 2011). In other words, deviating from the conventional radio context where listeners have no control over the flow and the contents, new media enables its audience to deliberately choose the contents, such as a playlist or an album. Consequently, a great amount of information about psychographics of the audience, like the moods, preferences, and lifestyle is indirectly communicated to the advertisers. For instance, depending on a music album, advertisers would be able to presume the listeners' psychographics and the level of exposure. This information becomes crucial for advertisers to precisely target their audiences in a more cost effective manner. Moreover, the listening would be more engaged compared to the conventional radio due to its interactive nature. Thus, the message of advertisements have more chance of being received though the new-media. ParksAssociates (2011) reported that 52% of digital audio listeners recognised internet radio advertisement. Therefore, audio advertisements will continue to play its role in advertising though certain channels, through which such communication happens, change.

1.2 MUSIC AND MESSAGE –THE TWO SALIENT STIMULI

Having considered an advertisement as a bundle of stimuli consisting of various elements, this research considers the effects of the two prominent and most important stimuli in such a bundle on the consumer's psychological state and consequent responses.

Music is seen as a highly valuable treasure with a fundamental and highly mystical power of human communication (North, Hargreaves, et al., 2004). Hecker (1984) noted that music has catalysing effects as “it augments pictures and colours words, and often adds a form of energy available through no other source” (p. 7). It is for this reason that billions of US dollars are spent every year on music in TV commercials, in shops and the like (Hargreaves & North, 1997). However, the insightfulness of advertisers regarding the effects that music would bring in to the effectiveness of an advertisement is also questionable (Olsen, 1994; Scott, 1990). This leads to the assumption that the mere presence of music will increase the effectiveness of advertisements (Craton & Lantos, 2011; Lantos & Craton, 2012), which Craton and Lantos (2011) called “music as garnish assumption” (p. 396).

Studies of evolutionary musicology produce evidence that music is an integral part of human communication and culture (see Blacking, 1976; Cross, 2001, 2006). It may be for this reason that music is capable of influencing cognitive, physical, and behavioural aspects of people. For instance, it has been found that different characteristics of music significantly influence the behaviour of consumers in the retail environment (North, Hargreaves, & McKendrick, 1999), while certain physical responses like changes in heart rate and skin contractions (e.g. Rickard, 2004) are also reported. Most importantly, music has a significant influence on psychological responses like improved memory and learning (Thaut, Peterson, & McIntosh, 2005), recovering from memory damage (e.g. Särkämö et al., 2008), and activation of brain networks that are associated with memory and motor functions (Friederici et al., 2004).

However, the way people use music has been changing dramatically over time. In contrast to using music in a very specific environment in the earlier days, experiencing music in the present day has become a personalised, day-to-day activity especially with

new technology like the Internet and iPod (North, Hargreaves, et al., 2004). Thus, it could be noted that the music is intertwined with the everyday lives of people (North, Hargreaves, et al., 2004) and that its presence or absence could make a difference in many aspects of them.

The message of an advertisement is undoubtedly the most important stimulus as it contains product-related information or carries the “message” to the targeted audience. However, depending on many factors like the type of product, advertising objectives, the audience, and the channel being used, the message of the advertisement varies. Thus, it could be as simple as articulating only the brand name or as complex as providing all the benefits of an investment loan. For instance, Boom Burger in the United Kingdom aired a 30-second radio advertisement containing the sound of a person drinking water, and only towards the end of the commercial did the message “Chicken treats Boom Burger is hotter and spicier than ever” appear. This is an example of a low involvement product using a simple message to communicate a feature of their burgers. In contrast, products such as loans frequently need to communicate the interest rates and compare them with the sponsor’s offering, making the message relatively complex. The California Credit Union auto loan radio commercial is an example of a complex message. There, it communicates existing market interest rates and compares them with Credit Union’s interest rates to communicate its message that it provides a better solution.

On the other hand, in line with the notion that the simple is always the best, advertisers attempt to make their advertisements as simple as they can. Westpac’s small business loan commercial bearing the theme “We provide expert solutions, whatever your conversation” is an example. However, the extent to which these simplified messages make the desired impact on the targeted audiences is questionable. Thus, it can be commonly observed that the organisations use longer infomercials to explain their message as opposed to 30-second or 45-second commercials. Thus, the need arises to use these salient stimuli more effectively to make the advertisements more communicative and impactful.

1.2.1 Advertisement as a Stimulus Bundle

As mentioned earlier, an advertisement is a bundle of stimuli and each stimulus can be identified with the elements in it. Therefore, consumer responses can be influenced by the interaction between these stimuli. This can be viewed at two levels: a) at the element level and b) at the salient stimulus level.

From the manner in which the musical elements (such as pitch, tempo, and timbre) are arranged, consumers would perceive a snippet of the advertisement as “music” (see Sabar, 2013; Wertheimer, 1938) and that the musical stimulus brings in a Gestalt effect. Hence, it is not a sonic mass *per se* (I. Bruner & Gordon, 1990). Similarly, depending on the information structures in the message, consumers will perceive a processing difficulty (Merriënboer & Sweller, 2005), which is the complexity of the message. Educational psychologists working in similar areas have pointed out that any educational material containing multiple structures trigger element interactivity that will in turn increase the effort to be put in to understand such materials (Merriënboer & Sweller, 2005; Sweller & Chandler, 1994).

At the stimulus level, how closely the music and message stimuli are related is considered, in other words, how *congruent* the music is in a given message context. When consumers perceive the effects of such stimuli related to one another, it will act as a unified unit bringing in complementary effects (see Macinnis & Park, 1991). However, a certain psychological state is expected to be in place should this *relatedness* be disturbed, in which case, the consumers may start processing the stimuli separately which may compete for the cognitive resources available for processing the advertisement.

Therefore, the two main characteristics considered in this study are the *congruence of music* and the *complexity of the message*. The former is considered without regard for the physical characteristics of the music but rather the perceived level of congruence with the message by considering music as a *whole*. The latter is considered with the number of individual information structures incorporated into the message. The following section explains the background of the study from these perspectives.

1.3 BACKGROUND OF THE STUDY

The subject of an advertisement as a set of stimuli bundled together, the effect of background music and message complexity on consumer psychology and consequent advertisement effectiveness has never been studied. Hence, there are at least four questions that remain unanswered in the literature on the use of music in advertisements. How do consumers respond to an advertisement when the stimuli are loosely vs. tightly bundled together? Can the music be used to increase the effectiveness of the reception of differently complex messages? What are the specific mechanisms of consumer response to the music congruence in an advertisement (i.e., what happens in the minds of consumers due to musical congruence/incongruence? and how are the cognitive resources allocated to process an advertisement in different music and message conditions?)

This study intends to investigate consumers' cognitive and affective response to music and message stimuli in an advertisement. In this regard special emphasis is given to psychological states caused by the music congruence and message complexity of an advertisement and the consequent demand for cognitive resources. Consumers expect the salient stimuli in an advertisement to be closely related to one another and depending on how closely related they are, certain psychological effects are expected. Hence, this study considers cognitive states that might result from the congruence of music with the message stimuli. Finally, depending on how the resources are utilised, the cognitive and the affective responses of consumers are examined.

Since the first use of music in an advertisement, organisations have been spending large amounts of money in the form of royalties hoping that they would increase the effectiveness of the advertisement (Oakes, 2007). However, this matter has not received adequate attention from researchers until recently (Craton & Lantos, 2011; Oakes, 2007). The researchers in this area have tapped into the vast and complex nature of music by manipulating its various characteristics such as tempo (e.g. Brooker & Wheatley, 1994; Kellaris & Kent, 1993; Kellaris & Rice, 1993), melody (e.g. Wallace, 1994), attention (e.g. Kellaris et al., 1993), genera (e.g. Hung, 2000, 2001; North, Mackenzie, Law, & Hargreaves, 2004 Exp 1; Yeoh & North, 2010), jingles (e.g. Scott, 1990; Wallace, 1991; Yalch, 1991), and congruence (e.g. Hung, 2000; Kellaris et al.,

1993; Macinnis & Park, 1991; North, Mackenzie, et al., 2004; Yeoh & North, 2010, 2011), in order mainly to study one or two direct effects such as attitude (see Craton & Lantos, 2011; Lantos & Craton, 2012 for review) and memory (e.g. Kellaris et al., 1993; Y. Shen & Chen, 2006; Yeoh & North, 2010). However, the findings are not consistent in highlighting the importance of further research into the area to enhance the understanding of the broad spectrum of its effects. For instance, music in general appeared to influence positively in some situations (e.g. Macinnis & Park, 1991; North, Mackenzie, et al., 2004; Park & Young, 1986; Yeoh & North, 2010, 2011), while it is reported as being a distraction in other cases (Brooker & Wheatley, 1994; Olsen, 1995; Sharma, 2011). Most of the research on musical congruence was based on Associative Network Theories like associative priming (e.g. Heckler & Childers, 1992; Yeoh & North, 2010, 2011) and the congruence was considered from music's ability to evoke imagery which was congruent with that of the brand / product (e.g. North, Mackenzie, et al., 2004; Yeoh & North, 2010). Accordingly, it is found that congruency primes the associated memory better than not using any form of music in commercials (e.g. North, Mackenzie, et al., 2004). On the other hand, some researchers (e.g. Kellaris et al., 1993) have reported that congruent music is only as good as a no-music situation, indicating that incongruence undermines an advertisement's effectiveness.

In all such research, the most important message stimulus of the advertisement has been neglected but instead the focus, other than on music, has been either on personal characteristics such as involvement (e.g. Park & Young, 1986) or contextual characteristics like the viewing context (e.g. Y. Shen & Chen, 2006). This common oversight has resulted in a failure to provide important insights into how musical stimuli influence differently complex messages of an advertisement. The other major lapse in the existing literature is that it has not studied the psychological effects on the consumers that will result in certain consumer responses like attitude or memory.

On the other hand, the literature also indicates conflicting findings on the subject of the complexity of the message. Although the existing evidence suggests that the complexity of the message undermines its receptiveness (Lowrey, 1998, 2006, 2008; Malhotra, 1982), the literature also suggests that the increased level of complexity improves the level of message processing due to the elevated level of processing (e.g. Lowrey, Shrum, & Dubitsky, 2003) and utility gains from processing complexity (e.g.

Bradley & Meeds, 2004). Hence, always adopting “simple and stupid” rule of thumb is questionable (Chamblee, Gilmore, Soldow, & Thomas, 1993; Lowrey, 2008) in advertising contexts. Depending on the type of product, audience, and objectives, advertisers need to incorporate varying types of information into the advertisement message making them different in complexity. Therefore, considering complexity from the information complexity paradigm appears to be more applicable than mere consideration of script complexity with structural manipulations that is common among the researchers in this area. Research on information load found the existence of a threshold beyond which the effectiveness of an advertisement is undermined (e.g. Malhotra, 1982; Sicilia & Ruiz, 2010). However, these researchers have mostly considered behavioural responses but not at all the consequent effects on memory. Additionally, it is worthwhile investigating the actual resource pressure exerted on the consumer in processing the advertisement considering the demand for cognitive resources such messages would make.

Neither has research on music in advertisements nor message complexity investigated the actual effects of one on the other. Especially, the manner in which musical stimuli in an advertisement influence the allocation of cognitive resources for processing the advertisement and consequent cognitive and affective responses have never been captured in a model. For instance, according to Cognitive Dissonance Theory (Cooper, 2007; Festinger, 1957), the level of incongruence of the music is expected to create dissonance cognitions that may generate a state which is experienced as psychological discomfort. Similarly, Cognitive Load Theory predicts that increased element interactivity of an advertisement message may result in higher demand for cognitive resources (Moreno & Park, 2010; Paas & Merriënboer, 1994a; Paas, Renkl, & Sweller, 2004). Therefore, this research will address this unexplored area by considering an advertisement as a bundle of stimuli and related processing demands.

1.4 RESEARCH QUESTION AND OBJECTIVE

Based on this discussion, six research questions are formulated. One of them is an overarching question and the other five are specific. Accordingly, five distinct research objectives are also formulated.

1.4.1 Research Question

What are the psychological consequences leading to advertisement effectiveness as a result of using differently congruent music with different complex messages in advertisements?

1. How does congruent music affect the processing demands of an advertisement?
2. Is incongruent music capable of generating dissonance state in the minds of consumers?
3. How do the elements represented by distinct attributes of an advertisement message affect cognitive resource pressure?
4. How are dissonance state and cognitive resource pressure reflected in the attitude towards an advertisement?
5. How is cognitive resource pressure reflected in encoding, storage, and retrieval of the advertisement message?

1.4.2 Objectives

1. To develop a model of consumer response to music and message in an advertisement taking an advertisement as a bundle of stimuli.
2. To determine if congruent music can be used to enhance the effectiveness of differently complex messages.
3. To determine the role of incongruence in generating dissonance in an advertisement music context.
4. To determine the manner in which the cognitive resource pressure behaves as a result of music congruence and message complexity.
5. To determine the role of cognitive resources pressure and experienced dissonance in advertisement effectiveness.

1.5 RESEARCH METHODOLOGY

In order to examine the consumers' responses to the variables considered in this study, a quantitative approach is adopted. Especially to examine the psychological effects of respective music and message conditions in an advertisement, it is vital to specifically manipulate those stimuli while controlling the other factors. Therefore, an experimental approach is adopted. Accordingly, 2 (congruent vs. incongruent music) x 2 (simple vs. complex message) between subject and x 2 (immediate vs. delayed memory) within subject mix design is adopted. Then the research participants are exposed to carefully created advertisements through experimental manipulations.

1.6 RESEARCH CONTRIBUTION

There are several theoretical and managerial implications resulting from this research. The theoretical implications can be identified at least in the areas of the music congruence effect of advertising, cognitive resource pressure, cognitive resources utilisation, and advertising research in general. Additionally, this research provides advertisement producers with important insights into the proper use of music in order to increase the reception of the message by the targeted audience.

1.6.1 Theoretical Implications

Music in Advertising

Current research contributes to broadening the limited scope of music effects in advertising. The limited amount of previous research in this area has mainly investigated the direct effects of music on a depending variable limiting the understanding of how such effects are generated. This research, on the other hand, provides an empirically validated model to understand the music effects on some aspects of consumer psychology and the subsequent influence on the effectiveness of an advertisement. More specifically, the role of music as a salient stimulus in increasing the effectiveness of an advertisement is examined.

Furthermore, this research is the first of its kind to investigate musical congruence on message complexity in an advertisement. Going beyond mere investigation of the direct

effects of musical influence, the model reveals the possible psychological effects which unlock various other research possibilities in the direction of advertising effectiveness. For instance, the cause of dissonance as psychological discomfort as a result of music being incongruent with the advertised message and their combined effect on cognitive load add a novel perspective to ongoing research.

Pressure for Cognitive Resources

The research also provides insights into the area of demand for cognitive resources. Specifically, considering an advertisement as a bundle of stimuli consisting of various elements, each makes demands on certain cognitive resources (see Brunken, Seufert, & Paas, 2010; Merriënboer & Sweller, 2005) from the pool of such resources allocated for processing the advertisement (Lang, 2000). For instance, distinct elements in an advertisement message require more cognitive resources, which are further affected by the congruence effects of music. When both these salient stimuli are perceived to have high congruence, musical stimuli attenuate cognitive pressure exerted on the consumers by the message stimuli. When the congruence is violated, the separation creates a dissonance state which in turn competes for cognitive resources contributing to cognitive resource pressure. These insights have not been proposed and tested empirically in previous advertising research and therefore this research unveils the psychological effects of advertisement stimulus processing.

Cognitive Resource Utilisation

The research also provides important insights into the way cognitive resources are utilised across various internal-processors/subsystems. More specifically, the effectiveness is determined by the utilised vs. abundance of cognitive resources. Deducing from the Resource-Matching Hypothesis (e.g. Anand & Sternthal, 1989; Meyers-Levy & Peracchio, 1995) and the Limited Capacity Model for Motivated Mediated Message Processing (e.g. Lang, 2000), the research provides useful insights into how congruent aspect of music affect the reception of the message of an advertisement. Further, the research highlights the possibility of combining the explanations derived from these two theories to obtain a more meaningful picture of resource utilisation and its consequences. Specifically, the level of cognitive resource pressure explains (a) how much resources are demanded against the allocated resources

for processing the advertisement (b) how resources are shared among the encoding and storage sub processors on which, the reception of the message is determined.

Advertising Research in General

In line with General System thinking (von Bertalanffy, 1973), the present research also highlights the importance of visualising an advertisement as a bundle of stimuli with various elements in it. The consistency and the cardinality of these elements determine the demand for cognitive resources to process the advertisement. The existence of any inconsistency between salient stimuli has the ability to generate a dissonance state characterised by psychological discomfort. Accordingly, the research model adopted provides an adequate explanation of the effectiveness of an advertisement in a generic setting.

1.6.2 Managerial Implications

This research is expected to provide advertisement producers with valuable information about the effective use of music in an advertisement. Especially, this research provides information on the appropriate use of music to achieve differential communication requirements with different types of products and objectives. It is the normal rule of thumb among the advertisers to make the advertisement message as simple as possible, which apparently is not applicable to every advertisement. For instance, it will be more practical for an advertisement of an impulse product to adopt a simple message while a high involvement product, like an investment loan, needs to communicate more information thus increasing the complexity of its message. In such situations, advertisers are inclined to adopt the more expensive option of increasing the frequency (see Jones, 1997; Pechmann & Stewart, 1988). However, the current research findings provide answers to these issues by way of using proper music to attenuate cognitive load and thereby to utilise the freed cognitive load to accommodate more information in the message without undermining its effectiveness.

Furthermore, the present research provides valuable information on the *cognitive* and *affective* consequences of the use of inappropriate music in an advertisement. If the wrong music is used with the wrong message, it will not only impair message reception

but also the attitude towards the advertisement. It *may* eventually affect the attitude towards the brand and purchase intentions.

1.7 THESIS OUTLINE

The thesis consists of six chapters and an overview of each chapter follows, while a brief outline of each is presented in Figure 1-1.

This chapter provided the background of the research and the initial conceptualisation of the problem. Thus, it started by introducing the background of advertising and the two salient stimuli in an audio advertisement – music and message. Next, the research questions and the objectives were presented followed by a brief introduction to the method adopted. The final section presented the theoretical and managerial contributions of the research.

Chapter Two deals with the literature pertaining to this study. It discusses music in general as well as specifically to the advertisement context. Then, it is followed by the theories pertaining to the congruence characteristic of music and consequential psychological states. The next section of the chapter discusses message complexity and the manner in which it affects consumers. The final section focuses on the literature in the area of cognitive resource allocation.

Chapter Three provides the conceptual model used in the present study for empirical testing. It contains an overall model with the predicted constructs followed by a brief explanation of the relationship between such constructs. It also states the formal hypotheses to be tested.

Chapter Four presents the methodology of the conducted research to test the hypotheses presented in Chapter Three. Thus, it starts by justifying the use of an experimental methodology. The next section of the chapter presents a detailed outline of the experiment development procedure including the development of the stimulus materials used in each condition. Further, the chapter also outlines the procedure adopted to measure each construct and covariates. Following a description of the sample, it

Chapter 1 – THESIS OVERVIEW

presents the pretesting and pilot testing procedure. Finally the experimental procedure is presented in detail.

Chapter Five contains the data analysis and the results. It provides a sample overview, scale testing, hypothesis testing and finally, the full hypothesised-model testing by using path analysis.

Chapter Six - the final chapter of the thesis- provides a detailed discussion of the findings related to each hypothesis. Following the general discussion of the findings is the discussion of theoretical and managerial implications. Limitations and future research directions are also discussed.

Figure 1-1 - Overview of Thesis

Chapter 01	<i>Thesis outline</i> Introduction; Background of the study; Research questions and objectives; Contribution
Chapter 02	<i>Literature Review</i> Music in advertising; Psychological Discomfort; Message Complexity; Cognitive Load; Cognitive Resource Utilization
Chapter 03	<i>Conceptual Model</i> Overview of the model; Research hypothesis; Covariates
Chapter 04	<i>Methodology</i> Stimulus manipulation; Instrument development; Sample; Pretesting and pilot testing; Experiment procedure
Chapter 05	<i>Analysis and Results</i> Sample overview; Scale testing; Hypothesis testing; Path analysis
Chapter 06	<i>Discussion</i> Brief overview of the model; Discussion of findings; General discussion; Contributions; Limitations; Future research directions

2 LITERATURE

2.1 INTRODUCTION

This chapter deals with the past research in the areas of interest in this study. It begins with an overview of music in advertisements giving a special emphasis to the congruence aspect. The next section covers the psychological discomfort literature pertaining to the inconsistency of cognitions generated by each advertisement stimulus. The chapter then presents the literature in the area of complexity before it discusses the cognitive pressure felt as a result of exposure to an advertisement. Then it presents the theoretical basis to be used in this study to understand the utilisation of cognitive resources in processing an advertisement. Finally, Section 6 presents attitude formation models relevant to the present study.

2.2 MUSIC

The main objective of this section is to bring the various aspects of music and related work in the field of advertising into the limelight. Thus, first it tries to find a solution to the question of defining music followed by bringing in different characteristics of a musical composition which are commonly manipulated in the related fields of research. The later part of this section discusses the literature pertaining to background music and the use of music in the marketing and advertising context.

Music is fundamental to every human society. Hence, the question of what music is has not only epistemological but also phylogenetic significance as it is central to human and cultural evolution (Fitch, 2005). Nevertheless, the literature commonly portrays the complexity of arriving at a definition of ‘music’ as it is closely linked with human emotions and language (see Addis, 1999; Godt, 2005; Kivy, 2002; Sloboda, 1988; Wallin, Merker, & Brown, 2000). Further, its universal and multifunctional nature makes such definitions complex and may leave most of the known music lacking many of the features these definitions would bring about (e.g. Hargreaves & North, 1997; Wallin et al., 2000).

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It is the nature of the *nature* to be full of diverse sounds. These sounds vary from a drop of dew to the sound of a bird most of which is not even receptive by the human ear. However, these sounds are not classified as music because the purpose of such sounds is not to express any human emotions and cannot be reproduced (Deutsch, 1999). Further, a definition for music is not generally sought as it is implied that *music* is what people refer to as it is (e.g. Cross, 2001; Godt, 2005; Head, 1997; Nettl, 2005) and the extent of this confusion is apparent among many writers. Additionally, encyclopaedias and general dictionaries that deal with music, skip providing a specific definition of it (Nettl, 2005). However, should such a definition to be arrived at, it may be less acceptable and less defensible in a scientific and philosophical context (Godt, 2005) due to its lack of specificity.

According to Godt (2005), any definition of music should have certain characteristics that would significantly identify it from other sounds either man-made or natural. He defines music in these words:

“Music is humanly organized sound, organized with intent into a recognisable aesthetic entity as a musical communication directed from a maker to a known or unforeseen listener, publicly through the medium of performer or privately by a performer as a listener.” (Godt, 2005, p. 84)

When considering various aspects of music, it can be noted that it consists of human generated sounds which are accepted by specific (sub) cultures and organised with elements like melodies, rhythms, and timbre, that have the ability to generate feelings and meanings. Thus, any sound such as the hiss of the wind, the sound of a bird, or the roar of an engine, which do not possess the above characteristics, will not qualify as *music* in human society though such sounds may be musical perhaps by their nature.

In the evolution of music, music and language apparently shared a common ancestry prior to their growth into separate branches. Marler (2000) uses literature to conclude that various sounds made by animals do not constitute *lexicoding* where the sequence of sound components brings out a specific meaning, but rather it is *phonocoding*, where such sequence does not bring out a specific meaning. It is this ability to phonocode that builds a relationship to human music (Marler, 2000).

2.2.1 Elements of Music and Genres

Music can be analysed according to the primary characteristics of the sound it generates and manipulates to obtain a wide range of musical expressions (Van Ess, 1970). These characteristics are known as the elements of music and are used specially in research on the psychology of music to analyse their effects on the brain and cognition (Deutsch, 1999). These elements are pitch, timbre, harmony, melody, rhythm, and tempo (see Deutsch, 1999; Temperley, 2004; Van Ess, 1970). Therefore, music cannot be considered as a singular sonic mass (I. Bruner & Gordon, 1990) but rather as a pattern that emerges as a result of the interaction of these elements so that the “whole” will be perceived as music (Wertheimer, 1938). See Section 2.2.5.1 for a further description. Table 2-1 presents a description of each of these elements.

Table 2-1 – Elements of Music

Element	Description
Pitch	The frequency of the sound which is grouped into classes called tonal pitch classes (Temperley, 2004). This is an extensively used parameter in music related studies of psychology (Deutsch, 1999).
Timbre	This is the colour of the sound or is determined by the physical structure of the sounding emitting device (Van Ess, 1970).
Harmony	This is produced by multiple, simultaneously generated, tones.
Melody	Melody is the overall pattern of frequency change or various tones perceived as a single entity (Deutsch, 1999) or it is the meaningful succession of a perceived single tone (Bernstein, 1956). Importantly, it requires the perception of relationship between successive tones (Bernstein, 1956).
Rhythm	This is the repetition of patterns noted in different time values and is based on the length and duration of a tone or a group of tones (Van Ess, 1970). It is primarily based on the stresses of tones (Bernstein, 1956).
Tempo	Tempo is the rate at which the pulses or the stress groups progress (Bernstein, 1956).
Texture	This is the manner in which the tones are arranged in a piece of music. Monophonic, polyphonic, and homophonic are the three main tones (Van Ess, 1970).

Music *genre* is a label for a *type* of music based on the overall reflection it has on society (Shuker, 1994) and it is very often distinguishable from the *form* of the music.

Any type of music is a combination of variations of its elements and their organisation into different categories creating different *forms* of music (Van Ess, 1970). On the one hand, the form of music is defined from the producers' perspective since it is they who choose the structure of the music. On the other hand, the *genre* of music covers a wide spectrum of present day commercial societies including the culture of listeners and the performers and are low in specificity (Shuker, 1994). Thus, *genre* is more attuned with the social aspect than the musicological aspect of music itself.

In the associated literature of music the classifiers of music genres are commonly ill-defined leaving most of such existing classifications less consistent (see Aucouturier & Pachet, 2003; Tzanetakis & Cook, 2002). Thus, despite some common genres like classical, rock and pop, others vary greatly from one taxonomy to another. For instance, Amazon.com identifies 719 genres, while allmusic.com and mp3.com recognises 531 and 430 genres respectively (Aucouturier & Pachet, 2003). Although such inconsistencies give rise to some practical issues of classifying music pieces, research on psychology, consumer behaviour and advertising continue to use the music genre to describe varying effects of music on different aspects of humans / consumers (e.g. Rentfrow & Gosling, 2007; Shevy, 2008).

2.2.2 Effects of background music

Any study of background music and its effects on task performance might result in ambiguity if such studies take certain characteristics of music and the task into consideration (see Cassidy & MacDonald, 2007). For instance, some studies show that background music is detrimental to task performance as opposed to silence or sometimes noise. In other cases, it is clear that background music assists in performing certain tasks like tests of IQ (Rauscher, Shaw, & Ky, 1995) or of mathematical reasoning (Hallam & Price, 1998; Vaughn, 2000).

The question therefore is whether to use music in the background in situations like advertisements and games or to maintain background silence at all times. In answering this query some research reveals that the background music is not supportive of tasks performed as it interferes significantly with them (e.g. Cassidy & MacDonald, 2007; North & Hargreaves, 1999; Ransdell & Gilroy, 2001). Using a computer game of car

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driving, North and Hargreaves (1999) revealed that high arousal background music resulted in low performance (higher lap time) while low arousal background music increased the performance under no extra cognitive load conditions especially when such music is liked by the person in the experiment. A study conducted by Cassidy and MacDonald (2007) found a result somewhat in line with this notion. Their result, however, showed that presence of any background music was detrimental to cognitive tasks like recall, while background silence, in contrast, increased such performance. A number of other research (e.g. Olsen, 2002; see also Olsen, 1995) found that background silence was better than music in recalling advertisement content.

Furthermore, there are studies that explain the non-existence of any effect of background music on task performance (North & Hargreaves, 1999). Madsen (1987) found that background music does not have any effect on reading and comprehension tasks performed by users while the study of Perrewe and Mizerski (1987) found that despite its disturbing nature, background music did not have any significant effect on the performance of a task. An earlier study of Wolfe (1983) also revealed an absence of a relationship between background music and performing a mathematical task. His experiment used four groups who were exposed to different levels of loudness such as no music, soft loudness, moderate loudness, and high loudness in the same set of a mathematic test. In spite of background music significantly disrupting group 4, the performance difference between groups remained insignificant. However, in a later discussion he argued that this was mainly because the subjects ignored the background music as they attended to cognitively demanding activities. Similarly, Konecni and Sargent-Pollock (1976) asked participants to choose a melody while engaging in a different complex tasks and found that the choice of a melody was determined by the complexity of the task in hand and it was independent of the level of arousal.

A possible explanation for such distracting effects can be drawn from the Divided Attention Theory (Konecni, 1982; Konecni & Sargent-Pollock, 1976) as an extension to Berlyne's Theory of Arousal (Berlyne, 1960). Konecni (1982) argues that listening to music also requires cognitive processing to understand the music and such processing utilises the cognitive space that is otherwise available for processing a task. However, his argument was that the complexity of the task would affect the choice of melody rather than background music affecting the task performance (Konecni, 1982; North &

Hargreaves, 1999). A limited number of studies has been conducted to test this hypothesis -the effect of background music on task performance- and the results were in line with the Konecni's argument. For instance, Kiger (1989) studied the effect of high vs. low information-load of music and silence on the performance of a comprehension task. The results of this study concluded that the task-performance was at its best with a low level of information load and at its worst with the other levels, thus supporting the Theory of Divided Attention.

In sum, musical, personal, and task-related factors seem to have a composite effect on the effectiveness of the use of music. For instance, factors like musical arousal and likability fall under the musical factors while involvement with the primary task and level of task difficulty fall under personal and task-related factors respectively. The next section explores the literature pertaining to the use of music in advertisements.

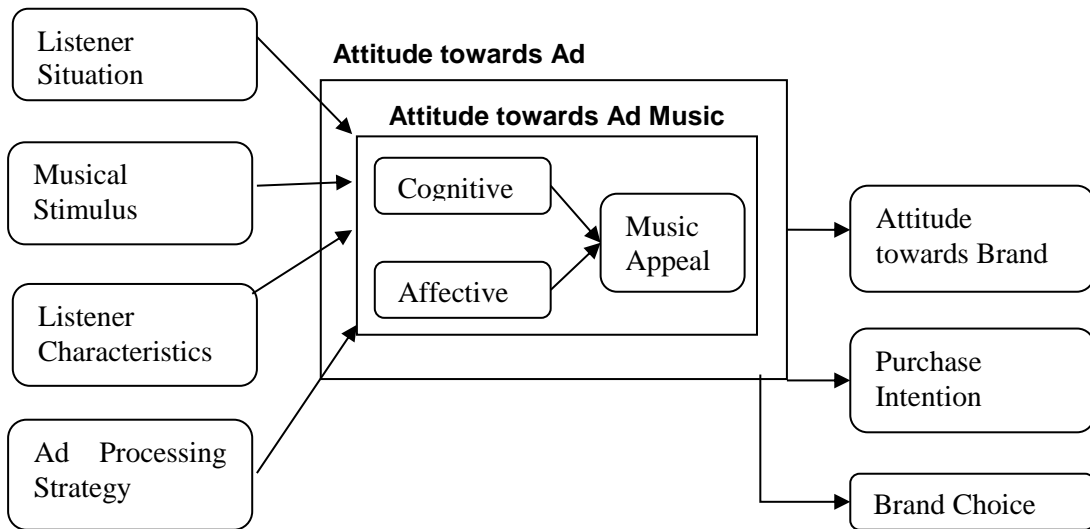
2.2.3 Music in Advertising

The first radio advertisement was aired in 1923 (Kellaris et al., 1993) and since then, music has been utilised widely in the domain of advertising. For instance, Pepsi-Cola Hit the Spot commercial, which was aired in 1930, was known to be the first to use a jingle in an advertisement. Brooker and Wheatley (1994) remarked, "Music has been incorporated in advertising messages at least since the early days of radio broadcasting but its effects are now beginning to be explored and understood" (p. 286). In spite of the little understanding of the actual effects of music in advertisements on consumers (Brooker & Wheatley, 1994; Olsen, 2002), a significant proportion of the considerable amount of annual advertising spending is on music in advertising (Kellaris et al., 1993; Oakes, 2007).

Some aspects of music in advertisements have been tested in the last few decades. However, it is apparent that there was a lack of a conceptual understanding of the way consumers respond to such use until Lantos and Craton (2012) proposed a model of Consumer Response to Advertising Music. They proposed this model (as shown in Figure 2-1) based on various empirical investigations previously done in the area. Though it is yet to be empirically validated, the model unveils the interplay of four antecedent variables that determines *attitude towards the advertisement music*, which

subsequently affects the attitude towards the brand, purchase intention, and brand choice (Lantos & Craton, 2012). These antecedent variables are *Listing Situation*, *Musical Stimulus*, *Listener Characteristics*, and *Advertising Processing Strategy*.

Drawing from the existing literature, they (Lantos & Craton, 2012) determined *listener situation* as the context in which a listener is either voluntarily or involuntarily exposed to advertisement music such as during a TV or radio programme. Ongoing activities, like eating or driving; social context, like whether or not a consumer is alone or with a group; and, programme context that triggers various viewer/listener moods like happy or sad are the circumstances that affect listing situation. Listener characteristics of the model try to capture various individual demographic characteristics like age and gender; socio-economic characteristics like culture and social class; psychographic characteristics like mood, personality, and musical taste that determines the attitude towards advertisement music. The way a consumer draws information and meaning from a particular advertisement is referred to as the advertising processing strategy. Thus, the level of advertising processing, which determines the level of information in the advertisement, is processed by the consumer; the nature of the product involvement that explains the nature (cognitive or affective) and the degree of involvement with a particular brand / product; and the type of advertising processing involvement that explains the consumer's involvement with the advertisement-message or advertisement-execution. The last of the four determinants of the model is the musical stimulus. According to Lantos and Craton, musical stimuli is a part of advertisement execution and its effects could vary based on the role it plays (as background or foreground), source of music (composed especially for the advertisement, modified, or copyright), structural characteristics of music used (e.g. timbre, pitch, time, complexity), the genre of music (e.g. classical, rock and R&B), and the music performer.

Figure 2-1- The Model of Consumer Response to Advertising Music

[Source: Lantos and Craton (2012), p. 24]

Some drawbacks can also be observed in the proposed model above. One of them is that this model ignores the characteristics of the advertisement message. It only considers the music as a separate cue and not as a part of the bundle of stimuli of an advertisement. Hence, the musical affects are rather disconnected with the central message except for the processing strategy which does not, however, capture the characteristics of the message being communicated. Therefore, it has neglected the prime objective of any advertisement of communicating the message across an audience. The other would be the effect of conflicting findings in the previous literature. Earlier studies that dealt with the concerning antecedents of this model did not provide adequate evidence for generalisation. Secondly, the model covers too broad a spectrum with too abstract antecedents which in turn lead to inter-factor interactions. For instance, Listener Characteristics and Listening Situation may be highly associated. As mentioned previously in this section, whether a listener is in a group or individual listening situation can be affected by the personality and/or the culture of the individual (Kraaykamp & Eijck, 2005; Weaver III, 2003). For instance, extraverts may tend to watch TV as a group. Similarly, what programs to be watched/listened to and how (attentive or background) listening/watching take place would be affected by the gender and the social class of the individual (e.g. Gantz, 1991; Shattuc, 2014). This may be because one's listening situation is decided by that individual depending on his/her

individual characteristics (e.g. Henning & Vorderer, 2001). However, the present conceptual model does not recognise such interaction as if the identified factors alone would determine the attitude towards advertisement music.

Though the model tries to capture a more generic setting within which the music affects various aspects of the attitude of consumers, it does not recognise the cognitive and affective states generated consequent to the use of music in advertisement. Hence, it provides little or no explanation of the psychological states leading to certain responses due to the use of music.

2.2.4 Categories of Factors

The *structure* and the *nature* can be considered as two main aspects of a musical stimulus. The *structure* is referred to as the characteristics of the music itself, e.g., timbre and loudness (e.g. Kellaris & Kent, 1993; Oakes & North, 2006), whereas the nature of the stimuli is referred to as what such stimuli bring to a specific audience (e.g. Dowling, 1978; Macinnis & Park, 1991). Due to the limited amount of research in this area, looking at the literature from a broader perspective is believed to be more meaningful rather than reviewing the literature pertaining only to what is relevant to this research. Further, such a review would provide an understanding of the elementary effects of different characteristics of the music on consumers. Therefore, the literature in this area is classified into the following categories, based on the nature of the music under considerations:

1. Self-reference to musical stimuli,
2. Vocal vs. instrumental music,
3. Musical vs. spoken message,
4. Level of advertisement-involvement, and
5. Music-message congruency.

2.2.4.1 Self-Reference to Musical Stimuli

A great deal of subjectivity could be observed with different kinds of musical stimuli as different people assign amounts of significance to such stimuli based on their differences (e.g. Saarikallio, 2011) such as experiences (e.g. Hsuan-Yi & Nai-Hwa, 2010), personality (e.g. Rentfrow & Gosling, 2007), and culture (e.g. Blacking, 1976;

Tota, 2001). Hence, the self-importance of the musical stimuli would have an influence on the effectiveness of the advertisement.

Here, self-reference to musical stimuli refers to the personal feelings or emotions generated by musical stimuli as a result of the existing musically associated memory. There are several studies that address this aspect of music in advertisements. Most studies have focused on attitude formation (e.g. Apaolaza-Ibáñez, Zander, & Hartmann, 2010; Hsuan-Yi & Nai-Hwa, 2010; Park & Young, 1986) while some on brand recall (e.g. Allan, 2006) and purchase intention (e.g. J. I. Alpert & Alpert, 1989). For instance, Allan (2006) found that a higher level of brand recall is associated with music that has a personal significance. He further found that when people have prior experience with a particular music, the original lyrics would be more effective than the altered ones. However, in the case of those who do not have such a specific association, modified lyrics would result in better recall. Having prior memory alone does not influence recall, but it is affected by the level of involvement of people with the advertisement-music. The study of Macinnis and Park (1991) showed it is not the involvement but the characteristic of the respective cue that would determine the message processing. However, they found that the effect of indexicality was predominantly on the non-message based processing when consumer involvement was high.

Prior memory of music leads to attention gaining and memory triggering (Allan, 2006). However, music with personal significance would tend to get more attention than it evokes memory. It is also argued that attention should occur first for advertisement contents to be remembered as it determines the significance of the stimulus and thereby categorise and recognise the same (Kahneman, 1973). Thus, it is apparent that the indexicality or the self-reference to music will interfere greatly with memory through activation and the way messages are processed. In other words, the use of familiar music tends to create bias situations not predominantly due to the effect of music but to the effects of schemas already stored in the consumer's memory.

2.2.4.2 *Vocal vs. instrumental background music*

Though some studies (e.g. Sewall & Sarel, 1986) found no effect of background music on consumers, music in any form in an advertisement tends to gain attention and thereby becomes effective (Allan, 2006; Lantos & Craton, 2012 for review; Wallace, 1991). For instance, a brand message conveyed with music tends to be more memorable than one without music (e.g. Wallace, 1991). However, knowledge of the effects of background music in advertisements is currently limited and should be further investigated (Lantos & Craton, 2012).

Background music of a commercial could be either with a vocal component or instrumental only. There is no consensus in the literature on the exact effects of background music on consumers (see for comparison J. I. Alpert & Alpert, 1991; North & Hargreaves, 1999; North, Mackenzie, et al., 2004; Olsen, 1995; Roehm, 2001). However, music with voice (or vocal songs) tends to gain more attention (Allan, 2006) than with background instrumental music or no-music conditions (Allan, 2006; J. I. Alpert & Alpert, 1991). This is mainly due to the ability of the voice to influence the affect-base of people (J. I. Alpert & Alpert, 1991) by grabbing the attention whereas background music left unattended fails to produce the same result. This notion is contradicted by the findings of Roehm (2001). In her study, subjects were asked to sing along with the instrumental version of the folk music and found that instrumental music leads to greater recall of memory as people tend to involve with the music when such music is familiar. Further, a study by Olsen (1995) with background silence as opposed to background music found that background silence is preferable over the latter. Especially, it was found that the use of silence as a highlighter of important parts of a message by cutting off the background music became highly effective. Considering vocal and background music in combination, Galizio and Hendrick (1972) found that vocal songs with guitar music are remembered better than pure vocal song.

Some studies have investigated the placement of music in the advertisement. For instance, placement of music in radio commercials enhances free recall (Brooker & Wheatley, 1994). It is also found that placement of ads with background music in a talk programme and no-background-music ads in musical programmes tend to result in higher recall (Sharma, 2011). Additionally, the lead-in effect for a voice message can

be achieved by placing music before the message, but without running it alongside of it that may eventually distract the attention away from the message (Brooker & Wheatley, 1994). These findings point to a direction where the use of music with highlighting characteristics (standing out from the context) would bring positive effects.

2.2.4.3 *Musical vs. spoken message*

Here, musical message is referred to as the advertisements that use music such as lyrics and jingles as the foreground to communicate the message (Lantos & Craton, 2012) whereas the spoken message is mere articulation of the message with or without background music. It is generally found that jingles (or musical messages) are more effective in recalling than texts or mere spoken message in an advertisement (e.g. Lantos & Craton, 2012 for review; Wallace, 1991; Wallace, 1994; Yalch, 1991). In fact, Lantos and Craton (2012) propose “carrying the advertisement’s message and meaning through musical lyrics, usually as a jingle, used to create brand image, mood, or feeling will be the strongest” (p.26). A probable reason for such facilitation is that a melody could act as a frame for information and when it is adequately simple to remember, it could facilitate recall (Wallace, 1994). In this case, the melody does not act as a distracter. However, structural complexities such as complex rhythms or large interval sizes in melody would attenuate recall (Wallace, 1994). A similar observation, though it is not directly connected with the melody, is made by Yalch (1991) that the more cues are presented to viewers than a simple melody, the less effective it becomes in terms of recall. This is because a simple melody does four main structuring to the text presented with it, namely, chunking, phrasing, sizing, and defining stress points (Wallace, 1994).

There is a fundamental difference between the cognitive processes engaged in processing a jingle and a spoken message. The text in a spoken message is processed semantically while the text in a melody is processed phonetically (Yalch, 1991) and therefore it could be said that the memory for a jingle is musical rather than factual.

As mentioned in the earlier section, it is considered that the altered lyrics result in higher brand recall (Allan, 2006). However, for recalling to be effective with modified lyrics, there are two prerequisites to be met. One is that such modification should be

relevant to the brand (Hsuan-Yi & Nai-Hwa, 2010) and the other is that consumers should not have prior associations with such a song (Allan, 2006). In the case of the audience having associated memories with the song, the original lyrics would be more relevant for gaining attention as the modified version is more likely to irritate such an audience.

2.2.4.4 *Level of involvement*

Consumer involvement in the advertising context has been studied extensively. Though involvement can be related to the level of the consumer's enduring inherent interest in a particular product or brand (Lantos & Craton, 2012, p. 31), it is mainly considered from the perspective of one's involvement with the music in an advertisement.

Studies concerning music in advertising found that the level of involvement influenced the level of recall. For instance, Park and Young (1986) explains a negative recalling ability with high-involvement consumers. The use of liked and popular music in high involvement situations tends to distract the advertisement processing while in low-involvement situations it generates no significant effects. Similarly, it could be said that different factors in different levels of involvement contexts lead to different results. For instance, Macinnis and Park (1991) suggest that musical fit and indexicality in different levels of involvement determined the route of advertisement processing. When the musical fit is high, message-based processing occurs with high-involvement users through an increased level of attention. In the case of a high degree of indexicality, high involvement users tend to get distracted while low-involvement users engage in message-based processing. However, high-involvement users are not affected by the low level of congruency or indexicality in terms of emotional response. It is proposed that the music in an advertisement is a part of overall advertisement processing involvement which could be through either high or low level of cognitive processing (Lantos & Craton, 2012).

2.2.4.5 *Music-message congruence*

Existence of element level harmony can be generally referred to as congruence and it is commonly called *music-fit* in the context of advertising. The word “fit” (p. 162) was first introduced to advertising literature by Macinnis and Park (1991) and later replaced

with “congruence” (Oakes, 2007). Music has the ability to communicate meanings and thus it is always juxtaposition with another element of the advertisement which requires it to be congruent with the second element (Hung, 2000). Hence, it is alternatively defined as the relevance or the appropriateness of music to the central advertisement message (Allan, 2006). Heckler and Childers (1992), on the other hand, challenged the existing definition of congruence highlighting that the importance and *relevance* of the information to the message being communicated would determine the impact of expected / unexpected characteristics, for the reason that the irrelevant information generally becomes uninformative.

Fit, in general (or congruence, in this study) is a subjective evaluation that consumers have about consistency between two elements such as music-message (e.g. Macinnis & Park, 1991) or voice-brand image (e.g. North, Mackenzie, et al., 2004: Exp 2); hence they identified it as the message relevant cue in the advertisement. Even message relevance is addressed differently in the literature. For instance, Macinnis and Park (1991) operationalise it as verbal-verbal while Kellaris et al. (1993) did it as nonverbal-verbal. These differences in conceptualising demonstrated the multi-faceted nature of congruence. Therefore, congruence is more of an umbrella concept rather than specific to a context for the reason that congruence can be achieved with any other construct under investigation. It could also be argued that even the physical characteristics of music such as timbre, tempo, and pitch would eventually come under this umbrella (e.g. Zander, 2006) where the effects on consumers is attributable to the congruence nature of music.

An interesting review of literature regarding the congruence in the field of advertising classed congruence into 10 categories: score, mood, repetition, association, valence, semantic, genre, image, tempo, and timbre (Oakes, 2007). On the other hand, the literature suggests the effect of music congruence in advertising is at least in four areas, namely, attention (e.g. Brooker & Wheatley, 1994), brand choice (e.g. North et al., 1999; Yeoh & North, 2011), recall (e.g. North, Mackenzie, et al., 2004; Yeoh & North, 2010), and attitude (e.g. North, Mackenzie, et al., 2004; Park & Young, 1986). In many cases, the congruence aspect of music appeared to be so vital that “careful consideration of music-message fit is the most effective strategy identified to date for avoiding many of the potential pitfalls of using music in advertising” (Craton & Lantos,

2011, p. 397). Despite its importance, however, only recently did it capture the interest of researchers investigating the elaboration processing of marketing communication (Heckler & Childers, 1992).

It is apparent that musical fit is positively related to advertisement effectiveness though with some exceptions. For instance, North, Hargreaves, et al. (2004) raised a doubt whether different levels of involvement of consumers would result in perception of the same level of musical fit. Their research suggested that low-involvement users may be unaware of a presence of musical fit. In other words, the tendency would be high for high involvement consumers to perceive the musical-fit. On the other hand, Macinnis and Park (1991) conducted an experiment manipulating fit and indexicality properties of music and the consumer's level of involvement. The type of media they used was television. In this research, however, music "fit" was manipulated by using the vocal component of the music (or songs) instead of using pure instrumental music. Therefore, the music placement was at the beginning (five seconds) and the end (seven seconds) of each treatment advertisement. The results of the structural path indicated that it was not the involvement *per se* that determined the message-based processing but the fit-characteristic of music. More specifically, fit music induced message-based processing through attention to the message in the case of high involvement users and through negative emotion in the case of low involvement users. There on, they suggest that even high involvement users are sensitive to executional cues given the fit characteristic of music is met. This may seem to contradict the Elaboration Likelihood Model, which suggests that the message elaboration will be greater with high-involvement consumers (Petty & Cacioppo, 1986a). However, this would be of further support to the suggestion that both central and peripheral cues are processed concurrently with high-involvement consumers (Park & Young, 1986).

Having deviated from Macinnis and Park (1991) definition of fit, Kellaris et al. (1993) operationalised music-message congruence as "the extent to which purely instrumental music evokes meanings (i.e., thoughts, images, feelings) that are congruent with those evoked by the message" (p. 115). The difference between these two was that the former used the vocal element of music to be consistent with what is being communicated in the message while the latter used the music's ability to evoke images to be consistent with that of the message. Their argument was that elicited imagery (e.g., excitement or

danger) being similar to that of the message, attention-gaining music would positively influence recall and recognition memory. Their findings suggest that attention-gaining music increases brand and message recall only in the congruent music condition and that such effects seem to disappear with incongruent music. However, they failed to find brand recognition to be significant across groups though the message recognition followed a similar pattern as recall memory. These findings are well in line with Craton and Lantos (2011) suggestion – careful consideration of music message congruence has become vital to avoid pitfalls in using music in advertisements.

It is a doubt as to when a certain object (e.g. music and words) get associated with one another. But it is interesting to see that one could trigger the memory of the other. For instance, the findings of Yoeh and North (2010) suggest that words that are more perceived to “fit” with rock and classical music respectively tend to have a greater recall when such words are presented with the corresponding music, which may influence the consumer’s decision process. However, Apaolaza-Ibáñez et al. (2010) suggest that it is highly likely that whatever brand-music combinations presented originally, where there is no such previous associations exists, they tend to be perceived as congruent.

Apart from the above mentioned advertisement processing context, the literature provides evidence favouring the use of congruent music in advertisements. One of the reasons is related to the ability of music to elicit emotions and activate memory traces. North, Mackenzie, et al. (2004 Exp 1) claimed that recall of advertisement contents, like product and brand name, was enhanced by musical fit. They tested this hypothesis by manipulating music fit (fit vs. no fit) with familiar brands and comparing them with the no-music base condition. They used a mixed sample as opposed to a student sample and found that music that fits with the brand had the best recall over the other two conditions. Further, they found that no use of music in an advertisement was better than using one that did not match and concluded that the musical fit may increase the activation of mental concepts while misfit would introduce distracting effects. Further, they also noted that musical fit addresses a broader level of associations than mere voice fit by comparing with the results of their subsequent research which investigated voice fit (North, Mackenzie, et al., 2004 Exp 2).

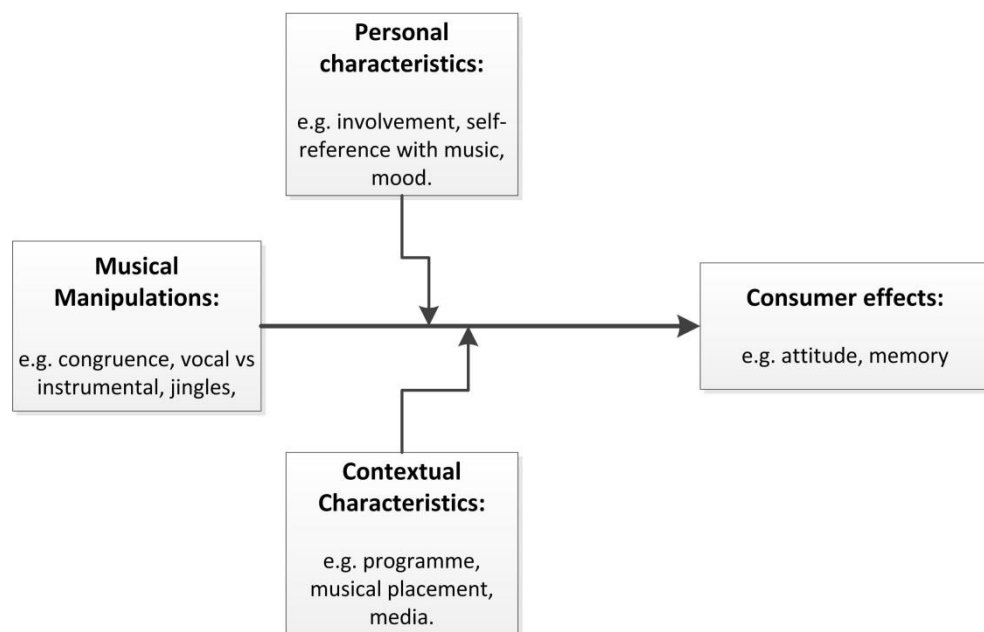
The above notion was further supported by Oakes and North (2006) showing that the higher the level of timbre congruity with the overall advertisement, the greater the recall of advertisement contents becomes such as brand name and telephone numbers. Another reason for such a higher level of recall was the level of attention that may be asserted by musical fit. In their study on attention-gaining music and level of congruency, Kellaris et al. (1993) reveal that content recall is better with attention-gaining music only when the degree of fit is higher. However, as opposed to North, Mackenzie, et al. (2004), they did not find any significant improvement from the no-music condition in recognition and brand recall scores, which suggested that the most preferred music condition would only be as good as the no-music condition. It was also clear that in the case of the “fit” being low, music became a distraction when it gained attention (Kellaris et al., 1993) or simply a noise that undermined advertisement content recall (Oakes & North, 2006).

While congruence seemed to affect consumers in a positive way, evidence can also be found in the literature suggesting that incongruence can also lead to improved performance (e.g. Hung, 2000; Y. Shen & Chen, 2006). One of the main reasons was related to the resultant enhancements in persuasion especially due to unexpected incongruence (Heckler & Childers, 1992). Using Expectancy-Relevance as the framework, Y. Shen and Chen (2006) showed that culturally incongruent music enhanced advertisement memory. They used television advertisements and manipulated the attention to the advertisement. The result also indicated that the aforesaid results were more pronounced for high-attention viewing contexts than those for the low. Similarly, Hung (2000) found that contextually incongruent music brought an alternate context in communicating the message, which would eventually enhance message processing.

When considering the above findings it is somewhat clear that the music effects on consumers are not always a simple construct but rather a result of interaction with many other factors such as motivation, involvement, and culture. Though the music congruence appeared to elicit positive effects on some situations (e.g. Kellaris et al., 1993; North, Mackenzie, et al., 2004; Yeoh & North, 2010, 2011), others reported incongruent music being effective (e.g. Fraser & Bradford, 2013; Y. Shen & Chen, 2006). Therefore, these mixed findings in the literature are yet to be addressed. Further,

these research usually investigated the direct effects on music congruence without empirically investigating the possible processing effects on the consumer. Another common conceptualisation of music message congruence was greatly biased towards direct verbal communication (e.g. Macinnis & Park, 1991), the evoked images (e.g. Kellaris et al., 1993; North, Mackenzie, et al., 2004), or moods (e.g. J. I. Alpert & Alpert, 1991). Alternatively, it can also be argued that the general perception of congruence about being congruent with the overall advertisement's disregard for the evoked images, moods, or the verbal contents would be more sense-making as the former (image, moods, etc.) is biased towards listeners' recognition of such thoughts or culture bound, when a considerable portion of them can be implicit as well (see Tillmann, Bharucha, & Bigand, 2000). Figure 2-2 summarises the effects on consumers of musical manipulations on consumers.

Figure 2-2 - Overview of Musical Effect on Consumers



2.2.5 Impact of Music Congruence on the Consumer

The impact of congruence in advertising on the consumer's psychology in general can be drawn from various theories. Konecni (1982) suggested that the inclusion of music would demand extra resources to process each component and hence the attention would be divided. Though the theory mainly concerns the divided attention based on processing multiple stimuli, it can also be related to the congruence in such a way that the attention would not be divided to the extent of becoming a distraction, if such music

is to be congruent. Support for this can be found in the literature (e.g. Kellaris et al., 1993).

The literature also identified other theories like Priming (e.g. Yeoh & North, 2010, 2011), Prototypicality (e.g. Martindale & Moore, 1988; Tillmann et al., 2000), Associative Network (e.g. Heckler & Childers, 1992), and Gestalt Psychology (see Macinnis & Park, 1991) to explain the effects. Importantly, these theories bring about various perspectives that the congruence can be conceptualised from. For instance, Associative Network Theories, including Priming, identify a musical snippet as an activator of a common set of associations, while prototypicality considers such stimuli being atypical of a schema in the memory to be congruent, which would in turn facilitate processing and schematic associations (see Cooper, 2007; Martindale & Moore, 1988). Gestalt theory, on the other hand, considered element interactivity and their intrinsic determination (e.g. Macinnis & Park, 1991) as the basis for congruence. Each of these theoretical bases provides a unique perspective on how congruence could affect consumers and demonstrate the complexity of the construct, when all these aspects are considered together. Most of these research used the prior schematic information (see Shevy, 2008) as the basis of conceptualising congruence, which falls into the social cognition domain (Heckler & Childers, 1992). Though their conceptualisation was adequately based on these theories, some research (e.g. Heckler & Childers, 1992) argued about the clarity of conceptual distinction among such researchers. However, these differences in conceptualising indicate more of the complex and multi-faceted nature of the concept of congruence than those researchers being conceptually unclear. It also implies the need for further research for greater conceptual clarity in this regard.

2.2.5.1 Gestalt Theory and Congruence

When considering an advertisement as a bundle of stimuli with interactive elements, Gestalt theory bears more relevance. The other theories become more applicable when *specific* memory related to a musical stimulus is available, which will be pivoted on past experiences. For instance, activation theories assume certain memory associations get activated while prototypicality requires an existing schema in the memory for deciding congruence. Though Gestalt theory also conceptualises experience-related

processing, it is more oriented towards *generic* experiences (Speck & Elliott, 1997) as opposed to the specific nature of the others. It is neither a top-down nor a bottom-up process but rather innate and automatic in nature without being influenced by learned and strategic processing (Speck & Elliott, 1997).

The theory goes far back as the beginning of the 20th century followed by the work of Christian von Ehrenfels in 1890 on the formulation of “form” and “whole,” where the latter became the fundamental quality known as “Gestalt quality” (see Sabar, 2013). Gestalt theory can be expressed as “...wholes, the behaviour of which is not determined by that of their individual elements, but where the part-processes are themselves determined by the intrinsic nature of the whole” (Wertheimer, 1938, p. 2). This concept of whole is as a result of element interaction and not related to specific physical characteristic of the element such as four lines constituting a square when the individual lines or angles do not say anything about it (Sabar, 2013).

The gist of the theory is that the meaning perceived through such element interactivity is “whole” and greater than the meanings of the individual elements (Wertheimer, 1938). These meanings are related to the experiences a person had in his/her life (Wertheimer, 1938) or, in other words, the organisation of stimuli is done with a great deal of subjectivity. This is the reason that when some random set of dots or incomplete figures are given, people tend to create their own patterns in them, which can also be used to categorise people (Speck & Elliott, 1997). Gestalt psychology addresses three broad categories of stimulus organisation: closure principle, principle of similarity, and figure-ground principle.

Out of many applications, Gestalt theory has been used in the area of understanding aesthetic objects such as art or a piece of music. For instance, one would be able to still recognise a melody after listening to a musical snippet only once, even though it is played in a new key or in a different tempo (Wertheimer, 1938). Similarly, a symphony of Beethoven comprises many parts played by many instruments in spite of those elements being individually different and bears less or no meaning at all compared to the whole symphony. Hence, it is not the physical characteristics or the parts of the music that are individually important but the meaning of “whole” as a result of the interaction between such parts (Speck & Elliott, 1997; Wertheimer, 1938). This also

emphasises the importance of considering the congruence through perceived measures to capture it at an abstract level.

In the light of Gestalt theory, Garner (1970) recognises an existence of “good” vs. “poor” patterns. The former is comprised of commonly perceptually-organised patterns out of a given set of elements (e.g., dots) while the latter is comprised of alternative perceptual organisations. Applying this to the advertisement elements, it could also be considered that the perception of congruence can stem from the perceptual organisation of these stimuli in the advertisement. In other words, it is the general concept of the “fit” or the congruence that the consumers would perceive in considering what comes out from the interaction of the advertisement stimulus-elements from an overarching perspective. This is what Macinnis and Park (1991) referred to as “emergent meaning” (p. 162). Furthermore, Speck and Elliott (1997) argue that the bottom-up approach to perceptual organisation is more close to the claims of Gestalt theory than the top-bottom approach for the reason the former is characterised by “whole” being “unmediated experience” (p. 163) where individual elements play no significant role in determining the whole.

On this premise, an argument can be put forth that considering individual structural characteristics of a stimuli may not be as important as considering the overall perception of congruence among such stimuli. For instance, structural characteristics like the tempo, loudness and texture of a musical snippet become important when they are considered at the element-level but the overall perception of congruence, which does not exist at the element level, emerges as a result of such interaction. Especially, in a case of not having prior specific memory / experience related to the stimulus elements (e.g., brand and music), considering congruence from the Gestalt perspective would be more applicable.

2.2.6 Summary

Sounds that are humanly organised with an intention and accepted by a culture are defined as music. Music has attracted other domains like psychology and marketing with its special effects on human cognition. Consequently, almost every advert in the present day situation utilises music either in the background as a peripheral cue or as a

jingle with the central message. The research carried in the this field commonly looked at the aspects of music like self-reference, fit (congruency), jingles, instrumental vs. vocal, and original vs. altered lyrics. However, when viewed from the Gestalt psychological perspective, congruence emerging as a result of element interactivity will be more sense-making especially in the case of unfamiliar stimuli. Nonetheless, in general, the effect of music on consumers is not a simple construct. It is dependent on the personal characteristics and contextual characteristics that are in play. However, it is clear that the music in any form in the present day commercials has a significant effect on their effectiveness.

2.3 PSYCHOLOGICAL DISCOMFORT

When viewing an advertisement as a bundle of stimuli, one could see separate as well as converged evaluations of salient stimuli in the minds of the consumers (e.g. Hecker, 1984). In the present research context, these salient stimuli are the background music and the message of the advertisement. Thus, based on the beliefs and expectations a consumer holds at the time of exposure, a set of cognitions pertaining to the advertisement's elements are expected to emerge and based on the status of such cognitions, certain psychological states will be determined. Accordingly, the congruence aspect of music in an advertisement could lead to a fit/non-fit or consistent/inconsistent psychological state

Experienced unpleasantness or discomfort can be related to many experiences of one's life. However, as mentioned before, the inconsistency (or consistency) is expected to occur between music and message stimuli, which trigger individual cognitions of each. For instance, when looking at someone's dress in a party, one will get two separate cognitions on the dress as well as the contexts (the party) leading to an evaluative psychological state. Since humans naturally seek consistency between what they experience psychologically (van Harreveld, Rutjens, Rotteveel, Nordgren, & van der Pligt, 2009), such inconsistency might trigger a state of dissonance experience as psychological discomfort. One seminal social psychology theory that explains this state of inconsistency is Cognitive Dissonance Theory (Festinger, 1957).

2.3.1 Theory of Cognitive Dissonance

Despite being old, some theories continue to contribute to the existing body of knowledge by way of being the foundation for new hypotheses or help explain a relationship between some factors. Festinger's (1957) Theory of Cognitive Dissonance is clearly one of such theories that has contributed to the understanding of social and human behaviours for decades (Galinsky, Stone, & Cooper, 2000).

The original definition of Cognitive Dissonance refers to the psychological discomfort created by the non-fitting relationships between cognitive elements (Festinger, 1957). He refers dissonance to inconsistency and consonance to constancy throughout the development of his theory (Elliot & Devine, 1994). Further, Festinger noted that it is not very different from general notions such as "hunger," "frustration," or "disequilibrium", where replacing the original word with such terms would continue to make perfect sense thus demonstrating the robust nature of the theory. In the case of cognitive elements, it could be any knowledge or opinions or beliefs about oneself, the environment, or the opinion about one's cognition that constitute a cognitive element (Eagly & Chaiken, 1993). Cooper (2007) remarked that "One of the brilliant innovations of cognitive dissonance theory was its use of a relatively new concept called 'cognition' " (p. 06).

The inconstancy occurs when someone is exposed to a situation that is non-fitting with what he/she knows or has an opinion about (Festinger, 1957). In his terms, dissonance exists when one cognition does not flow with the other (Cooper, 2007; Eagly & Chaiken, 1993). However, there could exist multiple cognitive elements related to a given situation and he implied that only the important elements matter. Thus, it is strictly a perceived state of mind.

The theory pivoted on two main notions, namely, that (1) the existence of cognitive dissonance being psychologically uncomfortable will motivate the person to reduce it and (2) the same person will actively take action to avoid situations that would likely increase such a dissonance. With the cultural and group interactions there comes a situation that one would learn or expect something which is different from what would exist in the environment which would cause dissonance to occur (see Cooper, 2007).

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The magnitude of dissonance more commonly associated with the importance attached to the dissonance-item (Festinger, 1957) and the actions such as changing behavioural cognitive elements, changing environmental cognitive elements, adding a new cognitive element, or trivialising the importance of the dissonance element (e.g. Burris, Harmon-Jones, & Tarpley, 1997; Simon, Greenberg, & Brehm, 1995) would be exercised as the dissonance reduction behaviour (see Cooper, 2007; Eagly & Chaiken, 1993; Olson & Stone, 2005). Nonetheless, research in this area commonly addressed the attitude change aspect as cognitive reduction behaviour due to the “difficult-to-undo” nature of already performed actions (Wegener & Carlston, 2005).

Cognitive dissonance can also be seen as having two main properties: dissonance as arousal and dissonance as psychological discomfort (see Elliot & Devine, 1994). The research investigating the former were predominantly based on response compliance or misattribution paradigms and supported that dissonance has arousal properties (e.g. Croyle & Cooper, 1983; Elliot & Devine, 1994). However, Elliot and Devine (1994) argued that most of the past researchers who investigated the arousal property gave little attention to the psychological discomfort component as originally delineated by Festinger. Although there had been a few studies examining the discomfort component, they largely focused on indirect measurement techniques and little had been found using direct self-reported techniques in this regard (Elliot & Devine, 1994).

As mentioned before, it is common among cognitive dissonance researchers to adopt the induced compliance paradigm, in which participants were forced to write something against their general belief (e.g. Cooper, 1998; Croyle & Cooper, 1983; Elkin & Leippe, 1986; Elliot & Devine, 1994; Gawronski & Strack, 2004). This method is commonly adopted based on the premise that the dissonance is generated when people compare committed behaviour against their standards (Stone & Cooper, 2001). Cooper and Fazio (1984) revisited cognitive dissonance and proposed a new model indicating the importance of aversive consequences for dissonance to occur and suggested that cognitive dissonance was not a just inconsistency *per se*, but rather caused by aversive consequences. An example of such aversive consequence would be related to something that the participants do not wish to occur (e.g. tuition fee increase - with a student sample). However, referring to the original theory delineated by Festinger, it could be argued that the other means of exposure to non-fitting elements could also

trigger cognitive dissonance. This notion can be supported to some extent by looking at the dissonance generation process from a different perspective. However, studies that controlled the aversive-consequence found that cognitive dissonance was rather independent of such consequences and was caused by the inconsistent cognitions *per se* (e.g. Harmon-Jones, 2000; Harmon-Jones, Brehm, Greenberg, Simon, & Nelson, 1996). Nonetheless, the question still remains whether a person should necessarily do something for dissonance to occur. The answer can be found in the work reported by Cooper (2010). There, he showed that Cognitive Dissonance could be generated in someone's mind by observing someone else's behaviour that happened to be inconsistent with his/her beliefs, which were independent of his/her own behaviours. It was called Vicarious Dissonance and it was proven by a series of research he and his colleagues conducted to demonstrate that students tend to feel Cognitive Dissonance as a result of the behaviours of others, who can be strongly identified as in-group members (Norton, Monin, Cooper, & Hogg, 2003). Thus, it is further implied that Cognitive Dissonance occurs as a result of inconsistent cognitions, not necessarily caused by an action, but by any cause.

Cognitive Dissonance research in the area of consumer behaviour has received special emphasis in post-purchase phenomenon (e.g. Korgaonkar & Moschis, 1982; Lindsey-Mullikin, 2003). In this regard, the magnitude of dissonance is determined by ranking chosen and unchosen alternatives (Cummings & Venkatesan, 1976), while some suggest that it varies based on parameters such as involvement (e.g. Korgaonkar & Moschis, 1982), repeated exposure (e.g. O'Neill & Palmer, 2004), and post-purchase communication (e.g. Milliman & Decker, 1990). However, variations of them have also been found. For instance, in a study investigating the cognitive dissonance state which might stem from the perceived difference between the expected and actual price, Lindsey-Mullikin (2003) found that such discrepancy in fact put consumers in a dissonance state. These findings and the findings related to vicarious dissonance suggest that dissonance can be generated without a person committing a behaviour that would challenge his/her beliefs or self-concept. Another study showed that Cognitive Dissonance existed not only at the post-purchase stage but also at the pre-purchase stage (Koller & Salzberger, 2007). Hence, it can be said that though it may not be to the same extent as it would be with values and attitudes related to one's self-concept, inconsistent cognition generated based on expectations and actual experience will also

have the ability to generate a Cognitive Dissonance state which is characterised by psychological discomfort. This distinction is more pronounced in the characteristics of *moral* and *hedonic* versions of dissonance (Kelman & Baron, 1974), a description of which is given next.

2.3.2 Moral vs. Hedonic Dissonance

Kelman and Baron (1974) suggested that cognitive dissonance could be of two types based on the level of significance that one would assign to the source (an act in their case) of his/her dissonance. They are *Moral Dissonance* and *Hedonic Dissonance*. The former is associated with the moral values and inconsistency with any of these cognitions would lead to a feeling of guilt. Hedonic dissonance, on the other hand, is associated with relatively insignificant values / beliefs of a person and the dissonance situation generated would be transitory more than lasting. Accordingly, it is somewhat apparent that *hedonic* dissonance occurs at a more superficial level while its *moral* counterpart operates in an innate layer.

Depending on the type of dissonance, the reduction action would be determined. The two authors suggested that attitude change is more likely to happen only in the case of moral dissonance. Hedonic dissonance, in contrast, is attenuated through means like distortion of experiences, selectively recalling pleasant features and trivialisation. Through these means, it is postulated that attitude change is less likely to happen. Holland, Meertens, and van Vugt (2002) used the Moral and Hedonic Dissonance model to show the way car drivers would attribute self-justification strategies to either internal or external causes as a result of an induced dissonance situation. The hypotheses they tested were affirmed noting that people tend to use internal self-justification strategies over external self-justification in the hedonic dissonance condition and vice versa. This suggests that hedonic dissonance is less threatening and transitory and therefore operates at a more superficial level.

2.3.3 Summary

There are several components of cognitive dissonance - the cognitions that would create a state of inconsistency, a felt psychological discomfort state as a result of such

inconsistency, and the behavioural component that would attenuate and/or prevent the felt discomfort. The robust yet complex nature of the construct was demonstrated by the findings of past research describing the antecedent conditions, moderators, and their consequences. As it is with any other theory, Cognitive Dissonance Theory has also taken many routes to its present day situation. Nonetheless, Wegener and Carlston (2005) noted that despite the different viewpoints “several core aspects of Festinger’s original theory have continued to ring true” (p. 516). In this regard, the psychological discomfort is one of those elements that have been unchanged in its fifty years of existence. Further, it is also apparent that the cognitive dissonance theory is a robust theory to explain the psychological state generated by inconsistent cognition without regarding the cause of those cognitions. The primary emphasis of this research is given to the psychological discomfort element and consequent demand for cognitive resources, but not the mechanisms of dissonance attenuation.

2.4 MESSAGE COMPLEXITY

This section is about the literature related to message complexity and concern areas of the present research. Defining complexity has been mostly domain specific and different definitions identify aspects that are unique to a specific domain out of the vast and general concept of complexity. Thus, this chapter begins with a working definition applicable to the present research and subsequently reviews the research of complexity in the domain of marketing and advertising.

2.4.1 Definition of Complexity

Complexity is a part of many systems (Standish, 2008). However, defining its existence has led to many inconsistencies and challenges across different domains (P. Anderson, 1999; Mikulecky, 1999 for review). In other terms, complexity has its adapted definition within an applied domain. For instance, one way of defining complexity is the number of distinct parts of anything, which views complexity as a quantity. Accordingly, it is as “a matter of the number and variety of an item’s constituent elements and of the elaborateness of their interrelational structure” (Rescher, 1998, p. 1). Another view point is the amount of information required to specify a system, which views complexity as information (see Standish, 2008). Though it is not defined

explicitly, in the context of advertising and consumer behaviour, complexity is referred to as the processing difficulty of the message contents (e.g. Bradley & Meeds, 2004; Lowrey, 1998, 2006; Lowrey, 2008). Thus, in general, complexity cannot be defined in absolute terms but as rather observer or context dependent (Standish, 2008), which necessitates a working definition for a specific use. Therefore, the following definition is adopted for the purpose of this research:

Message complexity is the perceived difficulty in processing and internalising the information carried by the elements or the parts of a given message of an advertisement.

Commonly, definitions of complexity considered it from the system perspective where number of elements and the interaction determine the complexity (Adami, 2002). Thus, such definitions mainly anchored in the “system” (or the “message” in this context). Though such conceptualization is important and relevant to the present study, it does not adequately reflect the pressure exerted by a specific advertisement message on the cognitive system of a consumer (or “observer complexity”) perspective to the definition (see Edmonds, 1995). Thus, the need arises to include the perceptual impact on a consumer as a result of message complexity. Therefore the present definition is adopted such a way that it captures the characteristics of the message while giving an emphasis on the way such complexity is perceived by a consumer.

One of the key aspects of this definition is the number of informational elements regarding a product presented to an audience in a single presentation (or in a single advertisement). In this context, a single advertisement is regarded as containing a single message that may communicate varying degrees of information. Hence, a single line of a message or a part of a message is not considered as an individual message but rather as a distinct piece of the same message communicated to an audience. For example, a different attribute or a function of a product will constitute an element of an advertisement message.

The other key concern is the perceived difficulty in processing and internalising the contents of the message. The level of complexity is subjective to the viewer and hence it is more rational to consider the perceived level of difficulty than to measure the level

of complexity by considering only the message-related properties. *Processing* means identifying the element of information in the message by accurately relating it to the meaning, while *internalising* means understanding information and its elements by semantically associating such meaning with the relevant context. Therefore, the complexity in this context will be a result of both message properties and personal characteristics of the viewer.

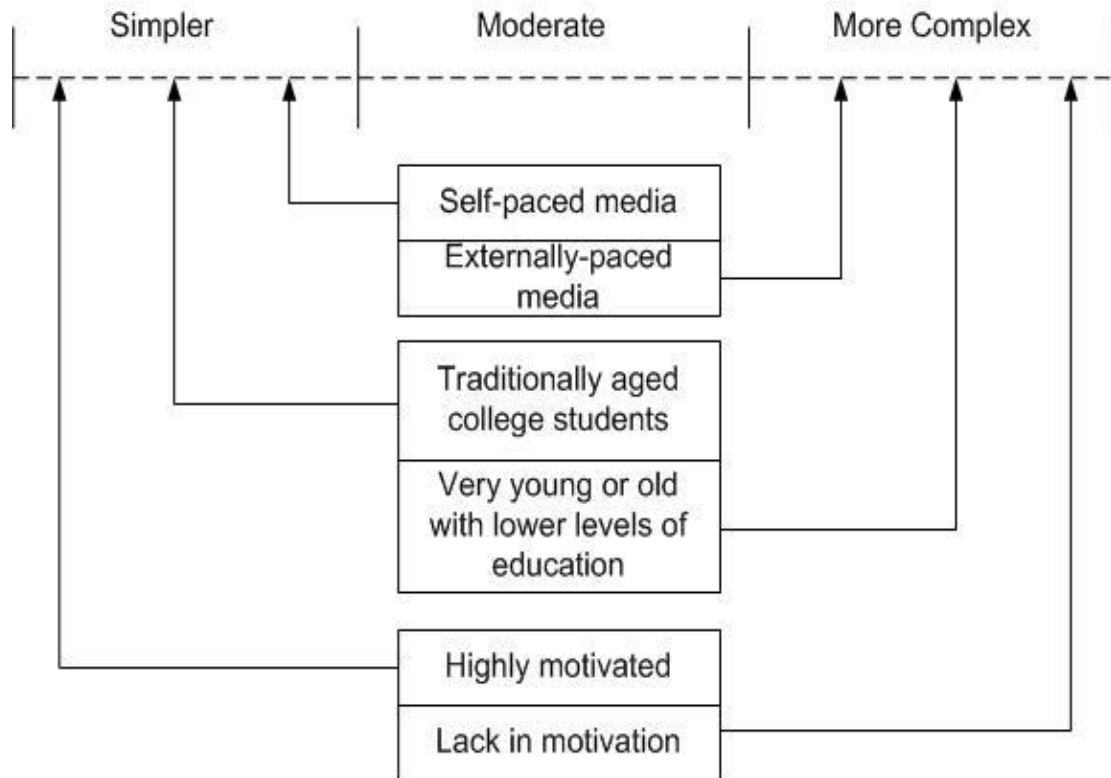
2.4.2 Antecedents of Message Complexity

Researchers have considered various antecedents of message complexity. For instance, voice (active/passive) of the message text (e.g. Bradley & Meeds, 2002; Lowrey, 1998), ratio of different words in a message (e.g. Chamblee et al., 1993), particle movement of a message (e.g. Bradley & Meeds, 2002), use of multiple language in a message (e.g. Luna, Lerman, & Peracchio, 2005), sentence structure like self-embedded sentences (e.g. McDaniel, 1981), and the length of the message (e.g. Shapiro, McNamara, Zurif, Lanzoni, & Cermak, 1992). In spite of the fact that most of these antecedents can be categorised as message structure-related, the findings are not always consistent. Lowrey (2008), however, was able to explain some of such inconsistencies with her model of Complexity Continuum, which also sheds light on categorising antecedent variables with their effect on perceived complexity especially in the advertising domain.

According to Lowrey's (2008) model, the complexity of an advertisement message is mainly determined by *textual* factors and *extratextual* factors. The textual factors are those that directly affect constituting a sentence such as *vocabulary* and *syntax*. Though it is not widely tested in the advertising context, she considered the length of the text also as a factor in determining its complexity. Further, she took text complexity measures into consideration in developing her model. Depending on these factors, the *textual* complexity of a message can be mapped on a continuum from simple to moderate to more complex. Nonetheless, she argued that considering only the textual factors would not be adequate to determine the actual level of complexity that may be experienced by an audience. Hence, she incorporated extratextual factors into the model that would determine the level of complexity combined with the textual factors. These

extratextual factors are advertising medium, individual differences, age, level of education, and the level of motivation (Figure 2-3).

Figure 2-3 - Effects of the Extratextual Factors on Complexity Continuum Shifts



[Source: Lowrey (2008), p. 164]

Though this model is the first to capture antecedent variables with the directional influence on the level of complexity, it is not without drawbacks. One such drawback concerns the way that the extratextual factors are defined. Although she mentioned that these factors act as shifters of the continuum, the existing model captures them in a discrete manner at two levels. For instance, media is described as self-paced and externally passed, where the value that can be occupied is only at two extremes. And, it is similar to the other factors as well. In such a situation, the model will not robustly describe the shifting influence they may have on the complexity continuum. Secondly, there could be interaction effects between extratextual factors. For instance, a highly motivated viewer may not perceive message complexity differently from a self-paced message even if they are exposed to an externally-paced message. The present model

does not capture such interaction effects but only the direct effects of the factors. Despite her mentioning about interaction between ability and motivation factors in her summary, such effects are not properly reflected in the model. Thirdly, the term “extratextual” would be too broad for the model to capture the factors that are relevant to complexity in a given situation.

A probable solution for the first drawback would be to define the factors also in a continuum. For instance, instead of using self-paced media and externally paced-media, the model could use “temporal freedom of media” that could occupy varying degrees of freedom to the viewer to process the message. For instance, a sentence of 20 words would not make a significant difference or an influence on complexity based on the type of the media but would be based on the time that is required to process the message and the time available to process it based on the media. Similarly, “level of ability” and “level of motivation to process” can be used in place of the other two factors. A suggested solution for the third problem would be to define it as “contextual factors.” This name would be more suitable as complexity occurs in a context where media characteristics and viewer / reader characteristics are considered. Further, such definition may provide more focus on the effects of complexity.

In summary, message complexity is not a single construct, but is rather determined by several factors. Among them are textual antecedents like the structure of the message and contextual antecedents like the media and personal characteristics.

2.4.3 Media and Complexity

In the light of the working definition of this research, it is important to take the media factor into account as the message presentation is different from one media to the other due to their inherent characteristics (Belch & Belch, 2009). Past research conducted in this area belonged to various media contexts, for instance, print media (e.g. Bradley & Meeds, 2002, 2004; Lowrey, 1998 Exp II; Lowrey, 2006 Study II), electronic media like websites (e.g. Geissler, Zinkhan, & Watson, 2006; Sicilia & Ruiz, 2010), and broadcast media like TV (e.g. Lowrey, 1998 Exp I; 2006 Study I). However, it is also apparent that the complexity-related literature is greatly biased towards the print media and very few researchers have considered the other media, especially broadcast media

(Lowrey, 2006). The reasons for such biasness may be that the written text is more relevant to the print media and the manipulation of text is always easier in the print media than in its counterparts. The works of Lowrey (1998, 2006), however, are the only studies that directly address message complexity in the TV environment.

The aforesaid media can be mainly categorised into two as *self-paced* media and *externally-paced* media (Lowrey, 2008). A key difference between these two presentations is that print ads are not widely constrained by time while radio commercials are. In other words, a print advertisement will provide time for consumers to read and understand its contents at their own pace (self-paced), while the other provides the consumer with a time frame that is limited to the time of the commercial (externally-paced). According to Lowery, when time is constrained for processing a message, it is experienced as a more complex message and accordingly if the same message appears in a radio commercial, it should be perceived to be more complex than its printed counterpart. Though this notion has not been directly researched in an experimental condition, past literature provide some support in this direction. For instance, it is mentioned that the viewer response to a television commercial is different from a similar response to other media due to the way the commercials are presented and subsequently affected by many factors (see Webb, 1979). Similarly, Lang et. al. (1999) showed that the specific variations in a TV message such as the number of cuts and arousing content will have an effect on the way cognitive resource allocation and message processing are done (see Section 2.5 for Cognitive Load). However, these researchers did not manipulate the message complexity syntactically or information-load wise.

When processing a sentence in a message or fragments in a message, the viewer needs to keep track of what has been processed in the working memory (Just & Carpenter, 1987). Further, in an effort to extract the meaning from the entire message, the viewer should cyclically refer its semantic associations and the previous processed parts of the message (Just & Carpenter, 1987). Thus, it could be said that a self-paced media like print will help the reader to pace the reading so that encoding of information happens. In case the reader cannot grasp what is said in a sentence or a message, he/she has the ability to go back to a specific location in the text and re-read the message taking any amount of time until he/she thinks that the message is understood. However, this

freedom is greatly restricted by an externally-paced media like radio. One reason is that the message fragmentation and the time of exposure are determined by the advertisement producer leaving no control for the viewer over the flow of information. The other reason is that such media does not enable the viewer / reader to refer back to the contents he/she has difficulty in processing. Therefore, it could be said that the externally-paced media poses more challenges to the viewer / reader in processing and understanding than in self-paced media (Lowrey, 2008). As a result a message appearing in an externally-paced media tends to be perceived as more complex than its counterpart.

The only study that is available to date that investigates the same message in both self-paced and externally-paced media is the study by Lowrey (2006). Though her study was not intended to investigate the effects of differently paced media on the perception of complexity, experimental material and findings have a direct relevance. This research comprised two studies. Study 1 investigated the memorability of messages appearing in TV commercials with varying degrees of complexity (very easy, easy, plain English, and difficult) and product category involvement. Study 2 used selected scripts from Study 1 after analysing its contents and using them in print form. Both studies concluded that the more complex the message is, the less memorable the contents become. These findings are not supportive of the notion claimed about self-paced and externally-paced media. However, these findings may occur due to several reasons. Firstly, the sample with which these studies were conducted was different. Study 1 utilised past research data collected from a sample of females between 18 and 65 whereas Study 2 used a sample of undergraduate students. Secondly, Study 1 was based on secondary data where there is no control over the other confounding factors while Study 2 is a more controlled experiment. Hence, the findings may not be directly comparable. However, this finding suggested that any syntactic manipulation alone cannot determine the level of complexity as it appeared to be a perception.

2.4.4 Complexity and Advertising

As mentioned earlier, researchers addressing the complexity of an advertisement message have been biased towards the domain of print ads resulting in a limited number of studies addressing such paradigms in TV/radio commercials (Lowrey,

2006). Considering this, the complexity of a message can be regarded from two main perspectives. One is the *linguistic* complexity of a message (e.g. Bradley & Meeds, 2002; Lowrey, 2006; Shapiro et al., 1992) and the other is the *informational* complexity of a message (e.g. Chen, Shang, & Kao, 2009; Jacoby, Speller, & Kohn, 1974; Malhotra, 1982; Putrevu, Tan, & Lord, 2004). While the former mainly concerns the syntactic structure and the respective transformations that occur in determining the complexity of a message, the latter concerns the amount of information such as product features included in it.

2.4.4.1 *Syntactic Complexity*

Syntactic complexity is referred to as syntactic parsing as an analysis of the text with the relationship between words to understand a sentence (Just & Carpenter, 1987). Processing difficulties may occur in the analysis which can be explained by two-stage theories and constraint-based theories. The former explains that sentence processing happens in two distinct stages, first picking up the possible meanings of a word and then choosing the most appropriate one for the context (MacDonald & Seidenberg, 2006). The latter explains that sentence comprehension is a continuous process that activates possible meanings at the same time and the analysis of the sentence occurs based on the support each source of information provides. Processing difficulty occurring during comprehension is described under two different aspects under each approach. According to two-stage theory, ambiguity is resolved by reanalysis of the first adopted structures. As per the constraint-based theories, ambiguity arises when competing support is received from sources which are closely related, and it is resolved by analysing the other words of the sentence (Pickering & Gompel, 2006 for a review). Accordingly, certain structural arrangements lead to difficulties in comprehending a text while others become comparatively easy (see Lowrey, 1998). Thus, researchers in various domains took an interest in manipulating complexity syntactically and examined various other effects. For instance, in the area of advertising, some such manipulations include active vs. passive voice (e.g. Bradley & Meeds, 2002), branching (e.g. Lowrey, 1998), and particle movements (e.g. Bradley & Meeds, 2002).

One of the theoretical models in psycholinguistics most referred to is Chomsky's (1957) Theory of Transformational Grammar (Bradley & Meeds, 2002). Accordingly, there are two main structures in any sentence. One is the primary idea of the sentence called the D-structure (or Deep Structure) and is also known as the kernel of the sentence. The other is the superficial structure that comprises words and phrases to convey the main idea of the sentence. This is called S-structure (Surface Structure) of the sentence. Many S-structures can be constructed to convey the same D-structure and the depending on them the mind has to transform from one to derive the other.

Utilising the psycholinguistic theories in the domain of advertising was not very popular (Lowrey, 1998). Consequently, only limited research can be found in the area and the findings mostly suggest that the scenario of complexity itself is complex (see Lowrey, 2008). Thus, the relationship between script complexity and subsequent effects on the consumer is not direct but rather moderated by a number of factors like involvement, motivation, and media. Furthermore, in some situations the level of complexity defined as low and high (see Bradley & Meeds, 2002; Geissler et al., 2006; Lowrey, 1998, 2006; McDaniel, 1981 for a comparison) is questionable and in other situations the index used to measure complexity is criticised (see Chamblee et al., 1993).

It is generally believed that high complexity will lead to a low level of memory as it directly relates to the ability to comprehend the message (D'Arcais, 1974; Lowrey, 1998 Exp I; 2006). In this study, it was found that the higher the complexity (with left branching and negations), the lower the memory it results in. However, there was no significant relationship found between the message complexity and the attitude towards the ads. One limitation of this study was that it had not been conducted in a controlled environment and the findings might have been contaminated. The participants were in their homes and material was broadcast through cable TV followed by telephone interviews. The second experiment was conducted in a more controlled environment and revealed no difference in memory with regard to both simple and complex syntaxes. Thus, it failed to replicate the results of the previous experiment. One possibility would be that the second experiment was on print media (see Section 2.4.3 for media effects).

Another important construct is the ability to process the message. Ability affects mainly the comprehension of a message and thus education is a main factor (Chamblée et al., 1993). They found that higher complexity has positive effects on highly educated people. However, this study utilised the Fog index while criticising the Flesch index, which is the commonly adapted index to measure syntactic complexity. Thus, the level of complexity used in this study is somewhat uncertain to be directly comparable with studies of a similar nature. However, it is apparent that ability overrides the motivation factor at some level. When a message is complex beyond the ability to process, the level of motivation becomes insignificant (Jean-Charles, Gelinas-Chebat, Hombourger, & Woodside, 2003). Involvement with the advertisement also influences the effects of complexity on consumers. For instance, high involvement users will have positive effects on memory (Bradley & Meeds, 2004; Cacioppo & Petty, 1982). However, these factors are interrelated and influence each other depending on the context.

2.4.4.2 Information Complexity

Information load is defined from several viewpoints in the literature. A pioneering study in the context of marketing defines information load as the variety of stimuli to which the receiver must attend (Jacoby et al., 1974). From the view of measurement, Scammon (1977) defines information load as the number of dimensions per brand where a dimension is an objectively testable fact. The major drawbacks of these definitions would be that they do not provide a reference to the load which could be measured. However, since they describe the information load aspect only, these definitions may be adequate but for this research purpose, it may be more appropriate to bring in the definitions of information overload to acknowledge the boundaries within which the information load operates. In that respect, Eppler and Mengis (2004) identify that though information overload can be simply defined as too much of information, it is recognised by many other terms such as cognitive overload, sensory overload, communication overload and information fatigue syndrome. All these aspects of information overload happen mainly owing to two factors, information processing requirement (IPR) and information processing capacity (IPC). IPR depends on characteristics such as the level of ambiguity, complexity and novelty while some of the factors like personal skills and the level of experience will determine IPC (Eppler & Mengis, 2004 for a review).

In spite of manipulating the structure of a sentence to achieve varying levels of complexity, the amount of information a message carries can also be used to achieve the same. Further, it is more relevant to say that treating complexity from the information load aspect would be more appropriate in the context of marketing for the reason that the complexity of a message would be determined by the amount of information in an advertisement message. Syntactic or structural manipulations are more relevant for the print media and it is questionable whether such manipulation brings much value to advertisements in the broadcast media.

Studies of information overload in the area of communication can be traced back to the 1950s to the studies of Miller (1956). Prior to this, the concept of information overload was recognised in the area of clinical psychology (Meyer, 1998) and it gained attention in the area of marketing with the pioneering studies of Jacoby and his associates (1974). Miller (1956) remarked that the amount of information is analogous to the amount of variance as it is used in other settings with a unit of measurement. For instance, the larger the variance is, the larger the amount of information it presents. He argued that if the amount of information provided is explained with a *unit*, it will get a new perspective to the topic under discussion. Thus, he explained the span of immediate memory with a processing unit called *chunk* and claimed that it neighboured around seven such units. This limit was then called the *span of absolute judgment*. Based on this explanation, later studies came up with the premise that the amount of information that might exceed processing capacity would be detrimental to performance and was referred to as the basis for the concept of information overload (see Eppler & Mengis, 2004; Jacoby et al., 1974; Malhotra, 1982).

The concept was first tested in the field of marketing by considering number of brands and the amount of information presented per brand (Jacoby et al., 1974). They were tested with information on a product package and when multiple products are to be evaluated with different levels of information load, the way a consumer selected the best brand was examined. They found that when the number of brands increases, the preference for not having additional information increases. Further, it is noted that satisfaction, certainty and confusion increase as the amount of information increases. A similar study in a broadcasting context revealed that information load was primarily

associated with brand knowledge and it had no significant effect on brand preferences (Scammon, 1977). However, in this study, the information was presented in the very last few seconds. Thus, considering the time available to process information, it is somewhat questionable whether consumers got enough time to process. With the purpose of finding the limits of overload, Malhotra (1982) manipulated a number of attributes and alternatives that appeared in a message. For this, he used increments of five in each up to 25 variants and found that information-overload happens with 10-15 alternatives and 15-25 attributes. It also became clear that in the case of overload, these two factors are independent. His explanations of such findings included that people use heuristics in dealing with information. However, another possibility could be that the consumer has to divide the time available to process this information (Scammon, 1977) and hence working memory becomes overloaded causing trouble recalling content and evaluating it at the same time.

The study by Jacoby et. al. (1974) was criticised for its various lapses. Some of them were statistical analysis, unbalanced design that prevents comparisons between findings, and the selection of the stimulus options (Jacoby, 1977; Malhotra, 1982). Based on critiques of this research and on a few others, concern was raised with the actual existence of information overload (Malhotra, 1982). However, later studies (e.g. Chen et al., 2009; Malhotra, 1982; Meyer, 1998; Scammon, 1977; Sicilia & Ruiz, 2010) with more advanced statistical analysis subsequently eliminated such doubts.

2.4.5 Complexity and Consumer Behaviour

The psychological response of consumers to complexity is not a simple and obvious construct (Lowrey, 2008). The general belief of “Keep It Simple, Stupid” among advertisement copy writers has been challenged many times as complexity is not always inversely related to advertisement effectiveness (e.g. Chamblee et al., 1993; Lowrey, 2008; Macklin, Bruvold, & Shea, 1985). This is a result of many factors such as the time presented to process the information (e.g. Eppler & Mengis, 2004), level of involvement (e.g. Greenwald & Leavitt, 1984; Lowrey, 1998 Exp III; Petty & Cacioppo, 1979), ability and the motivation to process (e.g. Chamblee et al., 1993; Jean-Charles et al., 2003), and the perceived utility of processing the message (e.g. Bradley & Meeds, 2002; McQuarrie & Mick, 1996). However, it is also accepted that a

very high level of complexity is detrimental to memory (Lowrey, 1998 Exp I; 2006). Thus, throughout the literature, the findings of complexity-related research are not without conflicts (see Lowrey, 2008).

Consumers remember sentences or messages in this context, not always syntactically. A considerable part of the syntactic information will be lost just after processing and what remains in the memory is the semantic information (D'Arcais, 1974). As a result, it may be true that simple messages are better remembered with its syntactic structures but not necessarily the semantic information or the meaning. When recalling a sentence, it is recalled largely with the semantic information and hence, the active voice is better than the passive due to the fact that the former is more close to the way one experiences a language (D'Arcais, 1974). In the field of psycholinguistics this is referred to as parsing or syntactic analysis which determines the actor and the action of a sentence. Thus based on the way sentences are structured, the comprehensibility of the sentence varies (Just & Carpenter, 1987). Further, they mention that understanding sentences will have a reference to one's knowledge and experience. This is referred to as the *referential representation* of a text.

Some research findings confirm that complexity is inversely related to the memory of consumers (Lowrey, 1998, 2006). The two experiments conducted by Lowrey (1998) using TV and print were examples of this. The one using TV commercials concluded that complexity impaired memory. The main reason for such behaviour was that complexity affected the ability to process the message. However, there were other factors like motivation and involvement together affecting the extent to which the information is processed. For instance, Jean-Charles et al. (2003) found, on the one hand, that when the level of motivation was low, only with the low-involvement of consumers the information processing would be low for high complex messages. When the level of motivation was high, the level of information processing became high regardless of the level of involvement. A similar conclusion was arrived at by Lowrey (1998). Her conclusion was that when the level of complexity is maintained at a moderate level, the level of processing is always affected by the motivation to process. Complexity in a way interferes with the working memory of consumers. When the complexity of the message increases, especially with the inconsistent words in a sentence, more resources will be allocated to identify and resolve the situation resulting

in less processing for encoding (Daneman & Carpenter, 1983). This happens when the processing demands of the comprehension activity exceed those available. Daneman and Carpenter (1983) concluded that the working memory would play a vital role in many processors, where only two words are to be encoded and retrieved, and therefore when more of it was used to retrieve meaning, less the processing that would be available for creating memories. Accordingly, when trying to resolve the complexity of a sentence, one would empty the working memory by forcibly giving attention to complexity. This explanation is somewhat in line with cognitive overloading. However, this is a deviation from cognitive overloading in a way that it is explained to people with poor readability who allocates more resources to comprehend the sentence compromising storage. It is apparent that humans have limited capacity to process information (Lang, 2000). Thus, when more complex messages demanding more resources are presented, cognitive overload is more likely to occur. This will subsequently undermine memory (e.g. Daneman & Carpenter, 1983).

The literature refers not only to the negative relationship between complexity and reception of a message but also about other forms of relationship. For instance, complexity can result in an elevated level of elaboration and consequently will increase memory (McDaniel, 1981), especially of those who are motivated and in high Need-for-Cognition (Bradley & Meeds, 2004). In other words, how well something is remembered is a function of how deeply it is processed (Cacioppo, Petty, & Morris, 1983). The most commonly referred to model in this regard is the Elaboration Likelihood Model (ELM), which explains that when elaboration likelihood is high, consumers tend to process the central message-argument, and when the elaboration likelihood is low the peripheral cues will get processed (Cacioppo et al., 1983). Further it explains that the elaboration likelihood will be high when the motivation and the ability to process the message becomes high. Therefore, it could be said that, *with-in* limits, when cognitive resources needed to process the message increases, it is likely that the elaboration likelihood also increases. Certain studies conclude that a medium level of information is preferable as too much information leads to overloading or prejudiced processing, and too little information may result in processing irrelevant thoughts (Anand & Sternthal, 1989; Sicilia & Ruiz, 2010). Thus, it is suggested that a medium level of information would enable utilising both central and peripheral cues (Sicilia & Ruiz, 2010) and it is clear that when complexity increases message

effectiveness also increases as a result of increased elaboration and *vice versa*. However, this happens only within the limits of cognitive capacity. Though it is identified with motivation to process in ELM, a high need for cognition has a significant interaction with the complexity of a message. Accordingly, the message effectiveness increases with the level of complexity especially with people with high need-for-cognition (e.g. Martin, Sherrard, & Wentzel, 2005; Putrevu et al., 2004).

Several authors have been trying to explain the possible reasons for the conflicting findings by relating them to personal (e.g. Jean-Charles et al., 2003; Just & Carpenter, 1987; Lowrey, 1998; Putrevu et al., 2004) and contextual (e.g. Lowrey, 2008) factors. Not only is it the motivation to process but also the utility gained by processing that may affect the way the message is processed. In other words, slightly complex advertisement messages may provide pleasure by resolving the complexity. This as a result will lead to better memory. Bradley and Meeds (2002) argue that such little complexity would be refreshing whereas greater complexity overloads consumers.

Furthermore, somewhat complex messages could also induce multiple encoding that may lead to positive effects on message reception. In a very interesting article on “A taxonomy for rhetoric in advertising” McQuarrie and Mick (1996) argued that when an irregular figuration was introduced with advertisement messages, additional cognitive activation occurred to understand the intended meaning. This would increase memorability. Further, in the Resource-Matching Hypothesis (Anand & Sternthal, 1989) and Berlyne’s Theory (Berlyne, 1960), they proposed that rhetorical operations such as reversal and destabilisation (complex figurations) enable effortful processing and thus will improve memory. However, they also admit that ability and some environmental factors like distraction could interfere with the elaborative processing. Hence, the within limit norm seemed to be applicable here as well.

2.4.6 Summary

This section reviewed the literature on message complexity and its effects on consumers in the context of advertising. It was apparent that the generally accepted “simpler the better” norm was overly simplistic. Perception of complexity was influenced by various other factors, mainly motivation, involvement, ability and the

media. Interaction among these factors would determine the resulting effect on the consumer. There were instances in which the simple message would be more persuasive and in other instances somewhat complex messages within limits would be better.

2.5 COGNITIVE LOAD

One of the emphases given in this research is on the cognitive resource allocation and consequent cognitive and affective responses. Accordingly, the demand for the cognitive resources would be determined by two conditions: (a) processing of advert stimuli and (b) related cognitive states generated in the minds of the consumer. In this line of thinking, it is important to consider a construct that will reflect the demand for cognitive resources and the excess of the same. Thus, considering cognitive load as a measurement would be the closest indicator to explain this scenario.

Cognitive Load is a construct that comes under the Cognitive Load Theory - the main objective of which is to employ instructional methods to efficiently utilise the limited capacity of the working memory of learners (Paas & Merriënboer, 1994a; Paas, Tuovinen, Tabbers, & Van Gerven, 2003). Thus, it is commonly identified in the domain of educational psychology and also used in a variety of other domains like consumer behaviour (e.g. Meyers-Levy & Peracchio, 1995), communication (e.g. Lang, 2000), flying (see Rubio, Díaz, Martín, & Puente, 2004), agriculture (e.g. Dey & Mann, 2010), and ergonomics (e.g. Galy, Cariou, & Mélan, 2012). Though, the complex and multifaceted nature of Cognitive Load makes it difficult to determine (Paas & Merriënboer, 1994a), it can be defined as “...the load that performing a particular task imposes on the cognitive system of learner” (p. 353).

2.5.1 Constitution of Cognitive Load

Paas and Merriënboer (1994a) presented a schematic representation of Cognitive Load which comprises *causal* and *assessment* factors. The former includes a task, a person, and the interaction of these two entities while the latter constitute mental load, mental effort and level of performance. Accordingly, a person's cognitive load is determined by a) the nature of the task such as the novelty, time pressure, and the reward; and b)

the nature of the person like his cognitive capability, cognitive style, and prior-knowledge. In turn, cognitive load is reflected in *mental workload*, which indicates the expected cognitive capacity; *mental effort*, which is the actual capacity allocated to perform the task; and finally the achievement aspect reflected in *performance* (Paas et al., 2003; Recarte & Nunes, 2003).

Furthermore, depending on the nature of the task being learnt, the way it is delivered, and the cognitive processors to processes it; there are three distinct types of cognitive loads described in the literature. They are intrinsic load, extraneous load, and germane load (Sweller, Merriënboer, & Paas, 1998).

Intrinsic Cognitive Load depends on the person as well as on the material and it appeared to be independent of the *delivery* methods (Sweller & Chandler, 1994). Thus, it is determined by the number of elements to be processed simultaneously in the working memory due to the demand for inter-element interactions or relationships (Merriënboer & Sweller, 2005). However, the level of felt load is different across individuals mainly due to schematic and processing operations (Sweller, 1994). Schema is the mental organisation of information elements and the manner in which the new information is treated will be mainly influenced by such organisation (Koedinger & Anderson, 1990; Sweller, 1994). For instance, two different people reading an article on consumer psychology would feel different levels of intrinsic cognitive load based on the schema already in place pertaining to the theory of concern; in other words, the reader's level of expertise. Similarly, the extent to which automatic and controlled operations engage will also influence the felt intrinsic load (Sweller, 1994). When information is new and the person has a goal in mind to acquire information, more effortful and controlled processing will be engaged and, as a result, the felt intrinsic load will be higher. Contrarily, information pertaining to well-established schemas would be processed with minimum conscious effort thus resulting in low intrinsic load. The automatic processing is also a form of orienting-response and anything that is related to survival (e.g. violence) or reproduction (e.g. sex) will be automatically processed (Lang, 2000).

On the other hand, *extrinsic cognitive load* is delivery-dependent and independent of schema activation (Sweller & Chandler, 1994). For instance, new information can be

presented entirely in written form or in a combination of pictures and written form. The former way of delivery tends to exert more extraneous cognitive load than the latter (see Merriënboer & Sweller, 2005). Though, the two forms of cognitive loads are independent (Sweller & Chandler, 1994), the element interactivity will still be present, not in a form of schema interaction but in the way such materials are presented. In the case of advertising, in addition to the contents of the message, the media utilised would also determine the type of cognitive load exerted. For instance, radio commercials are restricted to auditory stimuli while the other media are enabled with the use of multiple stimuli. Television advertisements are rich in this regard mainly due to its ability to animate visuals along with the auditory and other visual supports (see Lang, 2000).

The third type of load, *Germane Cognitive Load*, was first introduced as a construct in Cognitive Load Theory by Sweller et al. (1998). It is the load related to the processes of schema construction and automation. They suggested that if the load generated by intrinsic and extrinsic load is low, learning can be further enhanced by increasing the germane load to facilitate schema constructions. For instance, an example that helps learners to identify similar features while distinguishing them from unrelated features will result in germane load (see Merriënboer & Sweller, 2005).

It is clear that these three types of cognitive load are additive and thereon, the cumulative load and the free capacity can be subsequently determined. Furthermore, it is also considered that such a load must be within the limits of the working memory capacity (Paas et al., 2003) to avoid cognitive overload (Galy et al., 2012; Sweller et al., 1998).

2.5.2 Measuring of Cognitive Load

The multi-dimensional nature and complexity of the relationship between the subcomponents of the construct made it difficult for researchers to measure Cognitive Load (Sweller et al., 1998). However, past researchers use several techniques that could be classified mainly into two categories, Analytical technique and Empirical technique (Paas et al., 2003). The analytical technique seeks expert advice to determine the level of load that may be exerted on the subjects when performing a task while the empirical technique would use more objective methods. Further, the former may be biased

towards the subjectivity of the judge while the latter would warrant more objective measurement by reflecting the cognitive load of the individual subject. Physiological techniques, task and performance-based systems, and subjective techniques are the common methods (Sweller et al., 1998) that come under *empirical* techniques.

On the one hand, physiological techniques assume that cognitive load is reflected in physiology and thus, techniques like skin conductance (e.g. Engström, Johansson, & Östlund, 2005; Sundar & Kalyanaraman, 2004), pupil dilation (e.g. Hyönä, Tammola, & Alaja, 1995; Van Gerven, Paas, Van Merriënboer, & Schmidt, 2004), and heart rate (e.g. Engström et al., 2005; Galy et al., 2012) are commonly administered. On the other hand, subjective measurement techniques assume that subjects are capable of introspectively mentioning the amount of load felt (Paas & Merriënboer, 1994b). There are several commonly used subjective measures: NASA-Task Load Index (NASA-TLX; Hart & Staveland, 1988), Subjective Work Assessment Technique (SWAT), and Workload Profile (Tsang & Velazquez, 1996). Comparisons of these instruments done in past research reported that they were both valid and reliable measures for cognitive load despite the existence of differences in some aspects (Dey & Mann, 2010; Rubio et al., 2004).

Cognitive load has mainly been tested in most domains by administering a secondary task, and it is also applicable to the domain of marketing. Most of these comprise working memory tasks that are assumed to consume some of the cognitive resources restricting the available resources for processing. For instance, in research to test the effects of advertising thoughts related to senses and perceived taste, found that cognitive load impaired multi-sense thought generation making it similar to single-sense counterpart (Ryan & Krishna, 2010). Here, they asked participants to remember the first name and last name combination as the cognitive load manipulation. Similarly, Drolet and Luce (2004) asked participants to remember 20 words to be recalled later and found that consumers under high cognitive load conditions tend to avoid reporting trade-offs involved in emotion-laden choices. It was also found that in restricted cognitive conditions, overall price as a heuristic would be used to arrive at more quality judgements than the unit price that requires relatively effortful comparison (Yan, Sengupta, & Wyer Jr, 2014). The way such researchers manipulated cognitive load was by forcing participants to remember two and eight digit numbers in respective low and

high load conditions. Accordingly, it is apparent that cognitive load is used to impose restricted cognitive conditions, especially in the area of consumer behaviour, and the results were consistent with the notion that such restricted conditions limited processing.

However, some shortcomings associated with the use of such techniques can also be pointed out. One is that they do not take into account the actual cognitive load exerted by the processing demands concerning task/stimuli, but rather a task extraneous to the task/stimuli to be processed. Another is that such secondary activities being independent and unrelated to the task (mostly asking subjects to remember set of digits or to count), the effects may be due to the divided attention to an unrelated task than the cognitive load *per se*. It is also questionable whether drawing the attention to any unrelated task could be attributed to the cognitive load condition of the task at hand.

2.5.3 Cognitive Load and Resource Allocation

Two main models will be taken into consideration in the current research context to explain cognitive resource utilisation and its consequences. They are the Limited Capacity Model of Motivated Mediated Messages Processing (Lang, 2000) and Resource Matching Hypothesis (Anand & Sternthal, 1989). The following section provides a description of each.

2.5.3.1 Limited Capacity Model of Motivated Mediated Message Processing – LC4MP

Based on the premise that people being information processors and their ability to process information being limited (Basil, 1994; Bower, 2000; Chandler & Sweller, 1991), the theory of LC4MP (Lang, 2000; Lang, Shin, & Lee, 2005) was developed. This theory mainly rested on the information-processing paradigm and had five major assumptions: 1) Humans are limited capacity processors and the limited cognitive resources they have to be divided among many processings in their everyday life (regarding *cognition*). 2) There are two underlying motivational systems called appetitive, where people are motivated to approach, and aversive, where they are motivated to avoid (Lang, 1995). Both of these sub systems would influence the way cognitive resources are allocated (regarding the *motivational system*). 3) People are multi-sensory organisms having multi-sensory channels and corresponding formats for

processing (regarding *channel*). 4) Human cognition does not remain constant over the time that it is subject to change constantly. Hence, it is considered that human cognition is a dynamic process (regarding *time*). 5) Communication is a result of continuous interaction between human motivational systems and the communication message. It acts in a reciprocal manner in which the nature of motivation influences the way information is processed and the nature of information determines which motivation system is to be triggered (regarding communication: Lang, 2006).

Accordingly, information processing is determined by three sub-processors and two mechanisms, which occur constantly, simultaneously, and continuously (Lang, 2000, 2006). These sub-processors include (1) encoding, (2) storage, and (3) retrieval; and the mechanisms include (1) orienting response, which is reflexive in nature, and (2) resource allocation. Her model gave special emphasis to TV commercials and noted that message processing depends on the recipient's allocating resources to process the message and the actual availability of resources. In cases where resources are under allocated or over demanded, it will undermine message processing. Further, the model also acknowledges the simultaneous occurrence of these sub processors in the limited and perhaps fixed pool of cognitive resources (Lang, 2000).

Drawing from models of memory behaviours, LC4MP suggests the existence of competition for resources between *encoding* and *storage*, and recognition as well as recall measures are used as the indicators of these sub-processors respectively. Encoding is the process of extracting information from the environment and creating mental representations (Lang, 2000, 2006). This processes does not create verbatim the contents of a message but rather a meaning considered important will be extracted (Lang, 2006). Any information that is not encoded will be lost but every encoded-information is not guaranteed to be stored (Atkinson & Shiffrin, 1968; S. C. Brown & Craik, 2000; Lang, 2000).

More resources will be allocated for encoding (in this case it is from the stream of audio) over storage especially as a result of orienting responses and thereby affecting memory. She pointed out that various structural properties like music, animation and pacing of an advert trigger orienting responses. This may be the reason for attention gaining incongruent music impairing memory (Kellaris et al., 1993), where orienting

response might have allocated more resources for encoding music-related information neglecting the message-related encoding. Similarly, background silence in advertisements in a musical programme and background music in a talk programme improving memory (Sharma, 2011) can also be related to the reverse effect of the same. Unrelated to the music in advertising research, a number of other research also support this notion (e.g. Bolls, Muehling, & Yoon, 2003; Diao & Sundar, 2004; Lang et al., 1999).

Storage is “the process of linking newly encoded information to previously encoded information (or memories)” (Lang, 2000, p. 50). Accordingly, the more thinking is involved in the message, the more associations get created and the better storage it results in (J. R. Anderson, 2000). Thus, it is in line with the associative network theory that conceptualises human memory as a set of interconnected nodes. The number of connections and strength of associations determine how well such a node gets activated and hence the retrieval, as a response to a given stimulus (e.g. J. R. Anderson, 1996a). Some findings of neuropsychological research also support this conceptualisation (e.g. McClelland, McNaughton, & O'Reilly, 1995). Further, it is also clear that when music is congruent with a context, such as congruent imagery with the product (e.g. Kellaris et al., 1993; North, Mackenzie, et al., 2004) or brand-music congruence (e.g. Apaolaza-Ibáñez et al., 2010; Yeoh & North, 2011), the resultant memory is improved. This may be because the number and strength of associations created with the congruent music is higher with music activated nodes in a congruent condition than it is with an incongruent condition.

Nonetheless, according to LC4MP, the sub processors will compete for resources with one another and depending on the characteristics of the message and the motivational process that would be in place at the time of listening to a commercial, they will determine which sub process gets more resources over the other. Hence, the results vary accordingly (Lang, 2000, 2006). For instance, if the goal is to remember as much information as possible (e.g. watching an education programme) then the storage sub-processors will get more resources allocated thus weakening encoding. Based on its assumption of limited cognitive capacity, over demanding of resources will result in cognitive-overload.

Resource allocation in between processors is purely theoretical and “it cannot be pointed to in the human brain” (Lang, 2000, p. 55). Thus, the objective measurements mentioned earlier are considered to measure the cognitive load. However, in contrast to the commonly used secondary task to incapacitate the participants, the model proposed that the reaction time for the secondary task must be considered in determining the available resources. The rationale is that the delayed reaction is reflected in the scarcity level of resources.

The use of this model is evident in advertising literature. For instance, Sundar and Kalyanaraman (2004) tested the animation speed and memory in a web advertising context and found that recall was higher with slow animation ads when the page followed fast animation, while recognition differences remained insignificant. This suggests that the recovery from overload will make the resources available for storage. Additionally, higher recall and recognition scores for focal brand than secondary peripheral placement (placing in the side) were found in a study that investigated brand placement in games (M. Lee & Faber, 2007). In spite of the recall scores of inexperienced players being low even for the peripheral brand placements, recall for the focal brand also disappeared from highly involved experienced players. These findings particularly imply that the demand for cognitive resources for the primary task got priority for available resources over the secondary task processing (in this case they were brands). Additionally, negative valence of a message was also found to trigger more attention-related information processing (e.g. Bolls, Lang, & Potter, 2001) while a high level of syntactic complexity would result in cognitive overload (e.g. Bradley & Meeds, 2002).

2.5.3.2 Resource Matching Hypothesis – RM

On the premise that human cognition has limited resources and at a given time, only a portion of the available resources will be allocated to process message, Anand and Sternthal (1989) proposed the Resource-Matching Hypothesis to explain the relationship between message persuasion/effectiveness and resource utilisation. As with Lang’s model, this theory also used the principles of memory to some extent and mentioned that message effectiveness is determined by cognitive resources which act as internal inputs for processing (Anand & Sternthal, 1989). In this theory, there are

two situations that would undermine the effectiveness of a message: first, when the demand for cognitive resources by particular stimuli is less than what is allocated by the person at that time to process the message and second, when the demand for cognitive resources exceed that of available. The first leads to an abundance of resources while the second leads to cognitive overload. Hence, the effectiveness of the message would be superior in the resource matching condition. The theory does not suggest allocating all the cognitive resources available at a given time but rather suggests that one will allocate a certain amount of resources to process a message and whether the message's demand for resources matches with that of allocated. As a result, the persuasion of the message will follow a Wundt (inverted "U") curve.

With Scarcity of Resources

Resources will be limited in situations where the recipient fails to allocate enough resources. This may be mainly due to motivational issues. In other words, motivated recipients tend to allocate more resources to the pool of resources for processing the message than their unmotivated counterparts. The personal relevance of the message is also a part of the motivation factor. The other reason is the inherent complexity of the message to be processed that can be caused by several factors. Syntactic structure (see Section 2.4.4.1 for more information), quantitative vs. qualitative messages (e.g. Viswanathan & Narayanan, 1994; Yalch & Elmore-Yalch, 1984), amount of factual data in a message (e.g. Chang, 2007), and the characteristics of the stimuli bundle with the message are some of these factors (e.g. Meyers-Levy & Peracchio, 1995).

Inadequacy of resources can be dealt with by either increasing the available resources in the pool of resources for processing the message or by reducing the demand for resources (Anand & Sternthal, 1989; Meyers-Levy & Peracchio, 1995). According to the hypothesis, the former can be achieved by increasing message incongruity, personal relevance of the message, and exposure to the message. Message incongruity is described in relation to the knowledge / expectations the recipients already possess. Some factors like Need for Cognition also contribute to the motivation factor by increasing the invested resources to process the contents (Chang, 2007; Martin et al., 2005). Based on the notion that people will be motivated to acquire new knowledge that would not match with their expectations, more of the cognitive resources will be allocated to process the message (Anand & Sternthal, 1989). However, expertise makes

it an exception in a manner that little knowledge would not trigger resource allocation while personal relevance will. Experts, on the other hand, will be motivated to allocate more resources to process the contents that are personally relevant but incongruent (Hahn & Hwang, 1999; Heckler & Childers, 1992). In the original script Anand and Sternthal noted that in the case of cognitive overload, recipients tend to rely on heuristics or peripheral cue-related evaluations. This could be because of two things. One is that the lack of motivation makes the capacity of the resource pool small and the other is that modal specific resources may be utilised to evaluate the message. The former was supported in a research where picture and description layouts in an advertisement copy were tested against differently motivated recipients (Meyers-Levy & Peracchio, 1995). They found that the hypothesis appeared to be true for the motivated but not for the unmotivated users.

Multiple exposures to the message will make more resources available for processing the parts of the message in subsequent occurrences. However, too much repetition will eventually undermine persuasion (e.g. Cacioppo & Petty, 1989; Claypool, Mackie, Garcia-Marques, McIntosh, & Udall, 2004) due to the abundance of resource (e.g. Anand & Sternthal, 1990). This is common for exposure time as well and such a claim could be further supported by the type of media used. For instance, self-paced media like print may enable recipients to allocate more resources for processing due to active involvement and the ability to revisit the parts of the message (see Section 2.4.2 for more description).

With Abundance of Resources

The theory suggests that when available cognitive resources are higher than those required, persuasion/effectiveness will be undermined due to elaboration of idiosyncratic associations while having less elaboration of message content. Such idiosyncratic associations are message-related except that it is not messaging content. They are the other related memory activated due to the message (Anand & Sternthal, 1989).

Thus, as a solution, it is suggested that the resources demanded by the message / advertisement be increased or that the pool of resources available for processing the message be trimmed. Anand and Sternthal suggest several strategies to reduce resource

availability such as increasing the message presentation rate and introducing a distraction prior to and during the presentation of the message. The rate of message appeared to demand more of the resources mainly due to increased complexity. For instance, inclusion of diagnostic information in an advertisement will increase involvement and brand evaluation; however, further inclusion of such will attenuate brand evaluation (e.g. Chang, 2007; Peracchio & Meyers-Levy, 1997). Based on their prior research and the other related research, Anand and Sternthal suggest that the introduced distraction would use the abundant resources preventing elaboration of idiosyncratic associations (e.g. Hahn & Hwang, 1999). However, improved effects are subject to maintaining such techniques at the optimum level as over or under doing will cause a reduction of message effectiveness.

Some of the conflicting findings in the literature can be explained from the resource matching perspective. Especially such findings are significantly positive, negative, or not significant. (Keller & Block, 1997) put such conflicts to the test with the objective of finding answers from the resource matching perspective. They manipulated vividness of information presented on health-related issues in accordance with demand for cognitive resources to process each and found that it was not the vividness *per se*, but the extent to which each message met the resource-matching condition determines the level of persuasion. Nonetheless, these researchers mostly manipulated one or two stimuli to maintain the “moderate” level of resource utilisation without giving due emphasis to the innate resource pressure perceived by a consumer.

2.5.3.3 *LC4MP vs. RM Hypothesis*

Both LC4MP and RM Hypothesis have considered cognitive resources from the *available vs. allocated* perspective though it is addressed differently in their respective theoretical contexts. The major difference between the two models presented here is that LC4MP is predominantly based on the theories of memory and it tries to explain the effect of memory as a result of three sub-processors and resource allocation for each by two mechanisms. It goes by the notion “when resources are allocated for processing” while the Resource Matching Theory tries to address the notion of “when resources are not *fully* demanded or over demanded.” Thus, the effects of the latter can be somewhat generally applicable while the former is more specific.

The explanation for some of the findings referring to Lang's model was not complete either. For instance, low brand recall found in high involving-experienced players in M. Lee and Faber (2007)'s study can be considered. An alternative argument for such findings could be that involvement could allocate more resources when experienced consumers allocate less of them and thereon high recall scores, which was not the finding. A possible reason for such ambiguity is that Lang's model could be most applicable to explaining the utilisation of resources between the sub-processors of a considered task. It does not fully explain the possible influence of the remaining resources considering the total pool of cognitive resources available, an explanation of which can be drawn from the RM Hypothesis. Furthermore, some of the findings (e.g. M. Lee & Faber, 2007; Sundar & Kalyanaraman, 2004) explained in LC4MP could have drawn a more complete explanation had such researchers used the Resource-Matching Hypothesis as well. Accordingly, it appears that these models are more complementary in explaining the effects and thus, both are considered in explaining the respective effects of this research.

2.5.4 Summary

Cognitive load is the cognitive pressure exerted by a task to be performed on the performer's cognitive system. It is a construct commonly considered in the domain of educational psychology and commonly applied in instructional designing. There are various methods already used by researchers to measure it. For instance, in addition to the physiological mechanisms like skin conductance, pupil dilation, and EEG, subjective measurement techniques like NASA-TLX and SWAT have also been used. Most of the research in the field of consumer behaviour has administered secondary tasks to truncate the available working memory for processing as a means of generating the cognitive load. Two bases can be used to explain resource utilisation and its effects based on the premise that cognitive load is a reflection of resource pressure. These are the Limited Capacity Model and the Resource Matching Theory. The former tries to capture the memory effects as a result of resource allocation between sub-processors while the latter tries to capture the overarching effects of a particular message's demand for cognitive resources vs. available resources for processing.

2.6 ATTITUDE

The construct of attitude has been of central importance in studies of social psychology since the beginning of the 20th century (Crano, Cooper, & Forgas, 2010; Eagly & Chaiken, 1993) and it can be considered as one of the most commonly addressed constructs in consumer behaviour research. It is fundamental to behaviour since it helps people to decide what to approach and what to avoid (Sweldens, Corneille, & Yzerbyt, 2014). People evaluate information presented to them externally by sources such as the media or from their own experience (Crano et al., 2010) in order to make judgments on themselves and their surrounding environment (Albarracin, Johnson, Zanna, & Kumkale, 2005). Based on these evaluations, either favourable or unfavourable dispositions, called attitudes, are generated (Eagly & Chaiken, 1993).

Despite a number of definitions of attitude in the literature (see Allport, 1967), they all contain the notion of evaluating information and linking the subsequently generated psychological state to an object or an event. For instance, Eagly and Chaiken (1993) define attitude as “..a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour” (p. 1) whereas an early definition by Allport (1967) states that “attitude is a mental and neural state of readiness, organised through experiences, exerting a directive or dynamic influence upon the individual’s response to all objects and situations to which it is related” (p. 8). Thus, it is apparent that attitude will not be generated until an evaluation of information occurs and a link is created between such evaluation and the object concerned. Accordingly, attitude as the “overall degree of favourability” (p. 29) towards the attitude object (Ajzen, 2001) is used as the definition in this research context.

Attitudes are stored in the memory and when the same object or a related cue is presented, these memories will get activated (Eagly & Chaiken, 1993). Hence, it gives rise to the subsequent question of whether attitude is persistent over time. Based on a review of the literature, Kruglanski and Stroebe (2005) noted that some attitudes were persistent while others were not based on the availability and/or accessibility of judgments related to such attitude object. This could even be on the same attitude object in a situation where attitudes take on ambivalence or “evaluative dissimilarity” (p. 123); hence, it could be context-dependent as well (Eagly & Chaiken, 1993). All in all, it is

accepted in the present day that attitude is a function of cognitive and affective experience on an attitude object and will be represented as a “summary” of such experience (Crano & Prislin, 2006).

2.6.1 Attitude Formation and Change

Considering the nature of the attitude, it is important to make a distinction between attitude formation and change. Though the primary concern of this research is skewed towards the formation of attitude rather than its change, an understanding of the latter may shed light on the former.

The distinction between formation and change of attitude was not prominent in the literature on attitude (Crano & Prislin, 2006). Interestingly, Bohnert and Dickel (2011) discussing various definitions given in the recent literature to highlight the debate between attitude as a stable entity vs. one constructed online, posited that attitude change is interrelated. Thus “...it may not be useful to distinguish between attitude formation and attitude change; instead, we speak of attitude change” (p. 397). However, attitude formation can be considered as the extent to which a person accepts or rejects an object (Crano & Prislin, 2006) and it is treated separate from attitude-change in the present research.

Eagly and Chaiken (1993) described attitude formation and change under several categories like Combinatorial Models (e.g. Expectancy-Value Model and Information-Integration Theory), Process Theories (e.g. Cognitive Response Model, Attribution Theory, and Dual-Processing Theories), Affective Processors (e.g. Classical Conditioning), and Motivational Processors (e.g. Cognitive Dissonance Theory). However, some of these theories are used to describe both formation and change of attitude. For instance, ELM has been used as a model to demonstrate both attitude formation (e.g. Meyers-Levy & Malaviya, 1999) and change (Petty & Cacioppo, 1986a).

Based on individual motivation and cognitive ability, attitudes that are more accessible will determine the accessibility of a valence that may exist about an object (Wilson, Lindsey, & Schooler, 2000). Attitude can also be formed due to automatic activation of

evaluations as a result of an exposure to a related stimulus. This is explained in the Associative and Propositional Evaluation Model (Belch, 2012). Accordingly, propositions are based on this associative information and used in the current judgment-process. Furthermore, it is also apparent that attitudes can be formed without conscious awareness (Eagly & Chaiken, 1993). Classical conditioning, mere exposure effect, and evaluative conditioning explain such implicit attitude formation, but from different perspectives.

2.6.1.1 Attitude in the Absence of Prior Information

Earlier studies of music and various aesthetic objects found a positive relationship between exposure frequency and the attitude towards those objects, although such findings were challenged on methodological grounds by subsequent researchers (see Eagly & Chaiken, 1993). Thus, based on a series of systematic studies, Zajonc (1968) concluded that repeated exposure even to nonsense stimuli generates a positive attitudinal effect. He also challenged an existing hypothesis -living beings tend to prefer novel stimuli to familiar ones. On this basis, it could be viewed that the valence acquired through Mere Exposure is non-associative since it does not need any cognitive mediation (Kruglanski & Stroebe, 2005), and therefore, falls into the implicit attitude forming paradigm (Crano & Prislin, 2006).

One explanation for this can be drawn from perceptual fluency (Fang, Singh, & Ahluwalia, 2007; Kruglanski & Stroebe, 2005; Reber, Winkielman, & Schwarz, 1998; Winkielman, Schwarz, Fazendeiro, & Reber, 2003), which purports that the increased level perception of a stimulus would generate positive affect-response about the object. These effects on attitude can be derived from two models: Fluency/Misattribution (PF/M) model and Hedonic Fluency Model (HFM; Fang et al., 2007). The former falls into the cognitive domain while the latter belongs to the affective domain. The PF/M model predicts people's tendency to misattribute the fluency they gained from past exposure to a stimuli presented with a stimulus that is salient at the time of exposure (see Fang et al., 2007). On the other hand, HFM predicts that a high level of process fluency can lead to a positive affect response partly because it triggers rewarding experience (Winkielman & Cacioppo, 2001).

Research in the area of attitude continues to support the claims made by mere exposure and misattribution paradigms that would further support the notion that attitudes are formed online. Some of the cognitive theories in psychology will explain how attitudes are formed in this regard. Research has shown that affective states generated based on an exposure could influence the content (i.e. information) and the way such information is processed (Forgas, 2010). The former is known as informational effect and the latter as processing effect and these effects will have an influence on the formation of attitude.

Informational effect has two mechanisms complementing each other (Forgas, 2010). The first is the *memory-based* mechanism. It suggests that affect states generated will prime some of the affect-related information and the evaluation of new information will be subject to such affect-related information, also known as mood-congruent effects attitude (Cho & Cheon, 2004). However, such effect would only be in place in the case of currently generated affect being strong enough to enable priming mechanisms (Forgas, 2010). The second is the *inferential mechanisms* that infer judgment of new information based on the generated affect state. This effect would mainly be in place when the object being evaluated is unfamiliar, there are no prior evaluations to consider, and the cognitive resources to perform an evaluation are inadequate (Forgas, 2010). Consequently, the evaluation of the object will be misattributed to the temporally generated state mainly due to inferential error. Thus various sub-optimal strategies such as heuristics will be employed (Forgas, 2010; Ha & McCann, 2008; Kruglanski, 1980) in the judgement formation process. In other words, instead of arriving at a judgement based on scrutinised information about the object, one will fall back to the subjective state of “How do I feel about this?” heuristic as a short cut to form an attitude (Schwarz & Clore, 1988).

The processing effect, on the other hand, suggests that the affect generated by attitude object would determine the manner in which it is evaluated (Forgas, 2010). Accordingly, superficial processing would be triggered with the positive attitude and one would arrive at judgment with greater confidence as a result. Here, schema-based information processing using existing attitude-related information will be employed (e.g. Isbell, 2004). On the contrary, more systematic and bottom-up information

processing will be triggered by the negative affect state (DeWick, 1935; Forgas, 2010; Tavassoli & Lee, 2003).

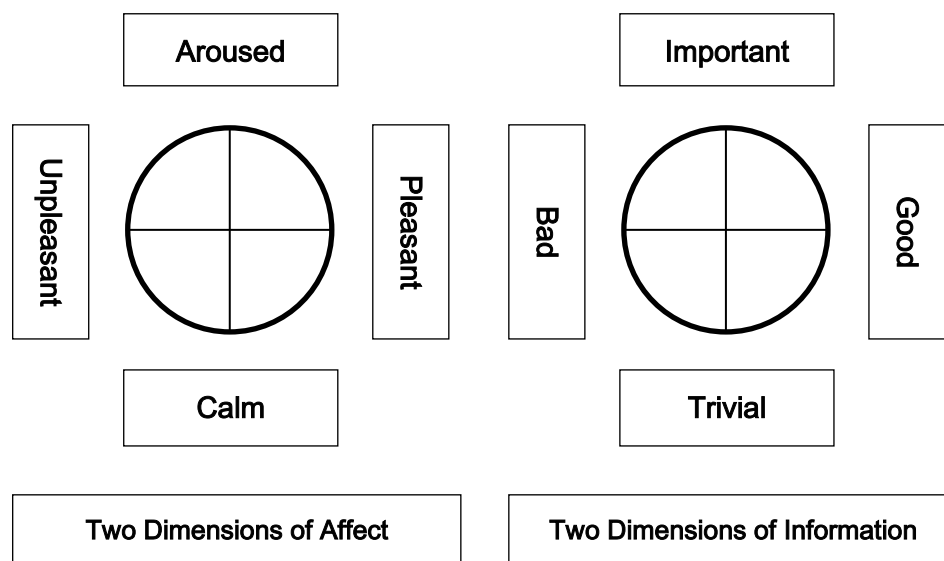
Within the paradigm of associative transfer, Evaluative Conditioning (EC) research explains that when a neutral stimulus is paired with a stimulus that has positive or negative valence, the neutral stimulus will acquire the valence of the affective stimulus (De Houwer, Thomas, & Baeyens, 2001). Though it is procedurally similar to Pavlovian Conditioning, the processing effects happened to be different (De Houwer et al., 2001). The effects of EC have been tested with different stimulus modalities (e.g. visual, gustatory, auditory, olfactory, and cross-modal) in various domains such as consumer behaviour, social psychology, and learning psychology and have proved to produce consistent results (see De Houwer et al., 2001 for a review).

It also appeared that the effects of EC are also valid in consumers' evaluation of products / brands. For instance, Gibson (2008) investigated whether implicit attitude would be changed in the case of familiar brands (Coke and Pepsi) as a result of positive (vs. negative) words and images. The Implicit Association Test results of this study revealed that the implicit attitudes to initially neutral brands changed as a result of EC (Exp 1). Using humorous cartoons as the unconditioned stimulus, Strick, van Baaren, Holland, and van Knippenberg (2009) also revealed similar results. They also found that the implicit attitude mediates product choice. However, it also appeared that a believable connection should exist between the affective stimulus and the person for EC to occur (Todorok, Byrnes, Wrzesniewski, & Rozin, 1995). Walther, Nagengast, and Trasselli (2005) purport that the effects of EC may be due to co-occurrence of neutral and affective stimulus that can be explained through the principles of Gestalt psychology. Though evidence has yet to be provided, it could be postulated that, for unfamiliar stimuli, EC is also a form of misattribution due to the absence of salient evidence pertaining to the neutral stimuli for proper attitude formation.

Multi-attribute attitude models (an overview is given in the Section 2.6.1.3) can generally be considered under traditional judgment theory which assumes that the evaluative beliefs are reflected by evaluative judgment (Clore, Gasper, & Garvin, 2001). Hence, these models typically derive the attitude towards an object based on the evaluative judgments of the individual attributes of the same object. For instance, the

attitude towards a product is evaluated based on the evaluation of individual attributes/components of that product. An argument contrary to this argues that evaluative judgment of an object is not necessarily as a result of evaluative judgements of individual components but rather as a result of how such an object as a “whole” makes an individual feel (Clore et al., 2001). In other words, “How do I feel about this” scenario again will be in place (Schwarz & Clore, 1988).

Figure 2-4 - Affect Transferred Information in Attitude Formation



[Source: Clore and Schnall (2005), p. 439]

Based on the two dimensions of *affect* and *information*, Clore and Schnall (2005) illustrated how information was transferred from an affect state to information, for making evaluative judgments (see Figure 2-4). Accordingly, the affect state has two bipolar dimensions with respect to *valence* and *arousal* in an integral fashion which is described as core-affect. One of the main characteristic of these core-affects is its free floating nature and the other is its association with an object (J. A. Russell, 2003, 2009). In other words, they are temporarily generated *mood*-states that are influenced by specific endogenous (e.g. wakefulness) or exogenous (e.g. music) factors and can be attributed to an object, such as an advertisement. It primarily differs from emotions also for the same reason (Clore et al., 2001; Schimmack & Crites Jr, 2005). Thus, a mood is an affective experience stimulated by a given object while emotions are elicited by the

cognitive appraisal of an act (Schimmack & Crites Jr, 2005). The valence can be considered as the subjective feeling of pleasant and unpleasant and it has the properties of *arousal* – activation / aroused and deactivation / calm (Clore & Schnall, 2005; J. A. Russell, 2009). In other words, the affect state of a consumer at a given time is an integration of these two dimensions of core-affects.

The two dimensions of *information* are characterised by importance and value (Clore & Schnall, 2005). The importance dimension consists of the Important and Trivial continuum and is determined by personal relevance, urgency or importance. For instance, an advertisement may contain information that is highly important for a recipient depending on the need state of that person (Greenwald & Leavitt, 1984). Similarly, a situation might trigger an evaluation to be good or bad. According to the model, the affect states generated as a result of exogenous factors would ultimately feed the evaluation process by conveying these states as the information for evaluation (Clore et al., 2001; Clore & Schnall, 2005). This whole affect transfer process in forming attitude is also known as the affect-as-information hypothesis (Clore et al., 2001). Hence, while the level of arousal drawing attention and making attitude information memorable, pleasant and unpleasant valence signals good or bad evaluation of the object (Clore & Schnall, 2005).

2.6.1.2 Consistency theories

The natural tendency for people to keep the cognitive elements in a harmonious state has been the basis for the consistency theories. These theories in general claim that falling out of such state of cognitive elements creates a “tension” in mind and people are naturally motivated to deal with the inconsistency to restore the equilibrium (Eagly & Chaiken, 1993). Balance Theory (Heider, 1946), Consistency Theory (Osgood & Tannenbaum, 1955), and Cognitive Dissonance Theory (see Section 2.3) come under this category of theories. However, Cognitive Dissonance Theory is regarded the most influential of all (Eagly & Chaiken, 1993) and considered the most relevant to the present study.

Cognitions that exist in the form of beliefs, attitudes, and behaviours tend to maintain a harmony between one another (Eagly & Chaiken, 1993). Hence, it was posited that the

magnitude of dissonance experience would be based on the number of consonant vs. dissonant elements that may exist (Eagly & Chaiken, 1993). Though the theory can explain influence on the attitude structure (e.g. Gawronski & Strack, 2004; Oxoby, 2004), it is most commonly used to explain the attitude change process (e.g. Elliot & Devine, 1994; Galinsky et al., 2000; Harmon-Jones, 2000). One of the main reasons could be related to the nature of the dissonance researchers that adopted the force compliance paradigm and conclusions were drawn from one of the cognitive dissonance reduction behaviours explained in the theory – i.e. change of cognitive elements (in this case, the attitude) to create a consonant condition (see Eagly & Chaiken, 1993). This happens due to not being able to “undo” an already performed action and thus the attitude will be changed (Wegener & Carlston, 2005). Recent research in neuropsychology has also shown that attitude change can be triggered by experience of Cognitive Dissonance (e.g. Jarcho, Berkman, & Lieberman, 2011). Alternatively, it may be argued that not only change of attitude towards behaviour, but also other forms of dissonance reduction behaviours – adding consonant cognitions and trivialisation of dissonant cognition – are in a manner related to new attitude formation through deliberate cognitive processes.

2.6.1.3 Overview of Multi-Attribute Models

The literature also supports the view that attributes are formed as a result of the evaluation of multiple attributes (see Eagly & Chaiken, 1993). Though such models are commonly applicable to designing solutions to more homogeneous consumer segments (Wilkie & Pessemier, 1973), it could also help to understand the attitudinal effect of the individual stimulus of a composite object like an advertisement. The basic models that are included in this category are Expectancy-Value Theory, Fishbein's Model, Rosenberg's Model, and Important/Adequacy Model (Lindgren & Konopa, 1980; Mazis, Ahtola, & Klippel, 1975). The predictability tests of consumer attitude of these four models reported the Importance/Adequacy Model to be most appropriate while the Fishbein's Model and Rosenberg's Model yielded no significant difference in predicting brand effects (Mazis et al., 1975). Nonetheless, the common ground covered by all these models was that the attitude towards an object / behaviour was depended on the individual evaluations of the attributes based on the associated believes and values of each (Ajzen, 2001).

2.6.1.4 *Dual vs. Single Route to Persuasion*

Despite the existing debate over treating attitude formation and change separately, the literature in this area has continued to treat them separately. Dual Process Models that describe attitude change are some of them. There are two prominent models of attitude change described in the dual process paradigm that have been strongly influencing attitude research – Elaboration Likelihood Model (ELM; Petty & Cacioppo, 1986b) and Heuristic-Systematic Model (HSM; see Eagly & Chaiken, 1993; Kruglanski & Stroebe, 2005). These models seek to make distinctions between the cue and message argument (Kruglanski & Stroebe, 2005). Although there are distinctive differences between the two models, they both have similar antecedents and outcomes (Eagly & Chaiken, 1993). Both models acknowledge that depending on the involvement with the message, two qualitatively different modes -central and peripheral in the case of ELM and systematic and heuristic in the case of HSM- will be engaged in influencing attitude (Kruglanski & Stroebe, 2005).

Later reconceptualisation of the above persuasion models has led to a *unimodel* of persuasion that argues the persuasion message and attitude formation to be primarily influenced by a single-route instead of a dual (Kruglanski & Thompson, 1999). On the basis of Lay Epistemic Theory (e.g. Kruglanski, 1980), Kruglanski and Thompson argue that informational contents identified as peripheral / heuristic or central / systematic in the above models do not influence differently on persuasion. Having acknowledged that the cues endogenous and exogenous to message may constitute different categories in their own ways, such categories will not be functionally different on persuasion. Instead, they view “persuasion as integrally related to the general epistemic process of judgment formation” (p. 89) and it is dependent on the motivation and the cognitive capacity of a person. Judgment formation happens based on the information relevant to the conclusion -referred to as *evidence*. Such evidence will be formed by collecting previous information relevant to the given persuasion setting from the memory; thus, it “...often entails considerable ‘cognitive work’ that is quite painstaking and laborious” (p. 90). Accordingly, it is the motivation and cognitive capacity that would preliminary determine the persuasion. Unimodel converges with Dual Processing Theories in the claim that motivation plays a significant role in the

process; especially HSM recognises accuracy, defensive, and impression management motives while Unimodel includes additional motives such as need for closure and need for cognition. Second, cognitive ability comprises two aspects -capability (known as software) that is related to the active cognitive structures which will be used in acquiring knowledge and in the judgment forming process; and capacity (known as hardware) that is determined by the “individual degree of alertness, energy level, or cognitive load” (p. 92), which limits the processing capabilities.

In addition to the four experiments presented by Kruglanski and Thompson (1999) in the same paper that proposed the model to support its claim, subsequent researchers who employed it as the basis were also able to verify the same (e.g. Chun, Spiegel, & Kruglanski, 2002; Pierro, Mannetti, Kruglanski, & Sleeth-Keppler, 2004). In conclusion, even the findings related to dual-process theories that claim the existence of cue / message-argument routes to persuasions can be classified into high/low motivation to process and high/low cognitive capacity (Kruglanski & Stroebe, 2005).

2.6.2 Summary

This section intended to bring about the multifaceted and complex nature of attitude formation and change. The answer to the question “What is attitude?” simple as it sounds, the affect and cognitive processes engaged to arrive at a judgment about an object is complex and involves many parameters. Formation of attitude is more relevant in this research context than its change counterpart. However, it is apparent that change of attitude is only applicable in the case of prior existence of judgment-related memory; otherwise, attitude formation procedures will be applicable. The formation can be either implicit or explicit and it is greatly influenced by the nature of the ambient stimuli and the nature of the person. In an effort to understand the effect on attitude from the cognitive resource utilisation perspective, *Unimodel* along with the misattribution perspective will provide a better understanding of attitude formation. For instance, *Unimodel* recognises that cognitive capacity is one of the determinants of persuasion. Misattribution, on the other hand, acknowledges that when cognitive capacity is limited, misattribution to the affect state can occur due to inferential error.

2.7 CHAPTER SUMMARY

This chapter presented the literature pertaining to the areas of interest in this research. Hence, the chapter started with a discussion of music in advertisements - one of the factors considered in the current study. Special emphasis was given to the congruence aspect of music in the advertising context and the Gestalt theory of psychology was explored as the basis for explaining the congruence effect. The next section discussed the literature regarding cognitive dissonance for the reason that the consumers may experience dissonance characterised by psychological discomfort due to the inconsistent cognition generated by incongruent music. In addition to discussing the theory in general, this section discussed the findings of the studies proving the existence of a dissonance state regardless of one's own action. Next, the literature relating to Message Complexity was reviewed with special emphasis on information complexity. The Cognitive Load section of the chapter attempted to provide concepts and theories relating to cognitive resource pressure and the latter part of this section presented two main theoretical models used to explain the effects of cognitive resource allocation. The final section of the chapter presented the literature relating to attitude formation. The next chapter of this thesis will present the conceptual model derived from the literature presented in this chapter along with a presentation of the formal hypotheses.

3 CONCEPTUAL MODEL

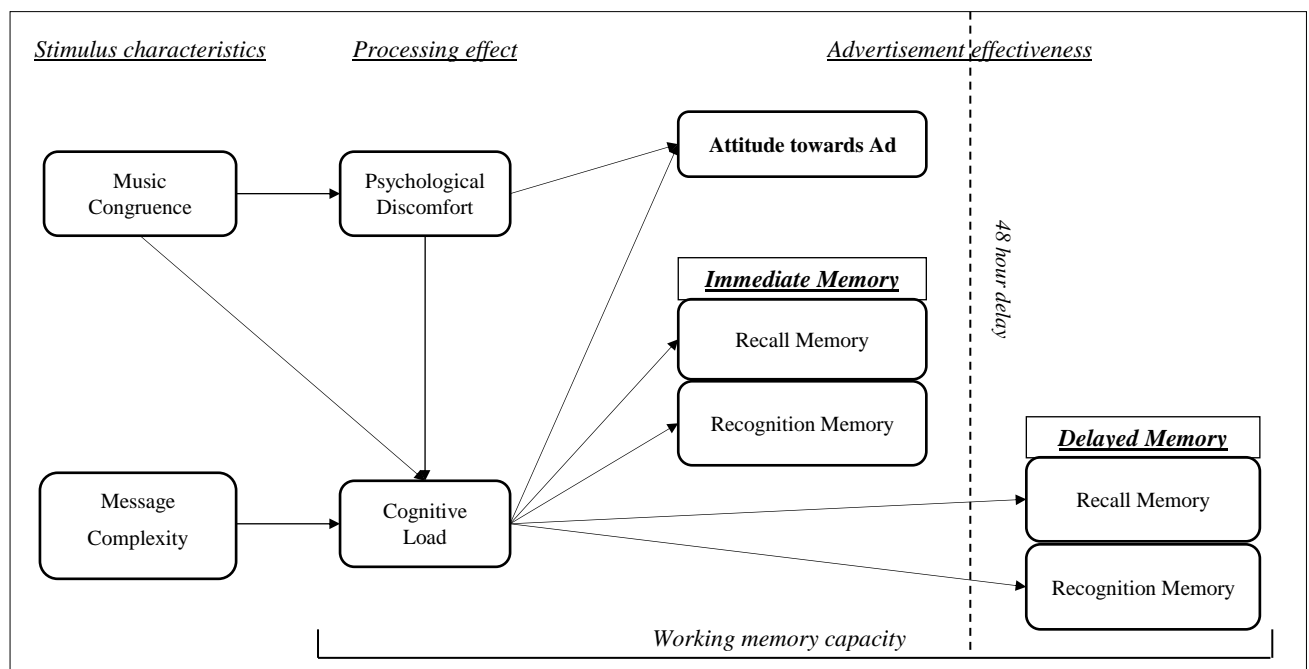
3.1 INTRODUCTION

The aim of this chapter is to present the conceptual model developed for this study. In achieving this, the chapter begins with the presentation of the model followed by a brief overview of its theoretical foundation. The sections that follow explain each hypothesised relationship between the constructs referred to in the relevant literature in support of them.

3.2 PROPOSED MODEL

Message complexity and music congruence are the two main stimulus characteristics taken into consideration in this study for assessing the effectiveness of an advertisement. Based on the literature presented in the previous chapter, the model presented in Figure 3-1 hypothesises the relationship that may exist between the constructs.

Figure 3-1 - Proposed Conceptual Model



Chapter 3 – CONCEPTUAL MODEL

The model illustrates two independent variables, Music Congruence and Message Complexity; two processing variables, Cognitive Load and Psychological Discomfort; and five effectiveness- related variables, Attitude towards Advertisement, Immediate Recall, Immediate Recognition, Delayed Recall, and Delayed Recognition. The remainder of this section discusses the overview of the model.

The premise of this study was that the consumers have limited cognitive capacity (Bower, 2000; Chandler & Sweller, 1991; Lang, 2000) and hence, the effectiveness of an advertisement (affective and cognitive) is determined by the way such cognitive resources are utilised across various sub processes (Anand & Sternthal, 1989; Lang, 2000). The manner in which these cognitive resources are utilised will be based on the demand for such resources by the advertisement stimuli (music and message) as well as the resultant psychological states (discomfort and cognitive load), which is in turn determined by the characteristics of the individual stimuli and how well they are related to each other (complexity and congruence).

Directly following the exposure to the advertisement stimuli, the consumer is expected to process the advertisement. However, based on the nature of the stimuli (congruent vs. incongruent music and complex vs. simple message), the consumer is expected to have two predominant cognitive states, psychological discomfort and cognitive load. Furthermore, it is expected that the presence of discomfort will demand resources to resolve the conflicting cognitions and thereby consuming resources on top of what is needed to process the stimuli of the advertisement from the pool of available cognitive resources. The net effect of available and demanded cognitive resources, called resources pressure, is reflected in cognitive load and predicted to determine the effectiveness of an advertisement from affective and cognitive perspectives. The former is reflected in the consumer's Attitude towards the Advertisement and the latter is reflected in the declarative memory of the consumer. It is expected that the performance of memory would be at its peak at the moderate level of cognitive load, while memory impairments are predicted to occur in remaining two extreme cognitive load conditions. Further, the memory that is *encoded* and *stored* in the resource matching condition is predicted to remain for a longer period. Hence, the delayed memory constructs shown in the model are obtained after approximately 48 hours from the first exposure.

It is also important to note that the entire model works within the boundaries of the working memory of a consumer, which acts as the workspace for all the related processes (A. D. Baddeley, 1992; Eysenck, 2012). Further, it is also believed that need for cognition would influence the processing of an advertisement. Thus, both working memory Capacity and Need for Cognition are considered as covariates in the above model. The next section describes the rationale for the hypotheses in the model.

3.3 RESEARCH HYPOTHESES

3.3.1 Change in Psychological Discomfort

The first hypothesis predicts that the psychological discomfort state of a consumer occurs as a result of the perceived background music congruence. Thereby, it is predicted that the perceived level of psychological discomfort is heightened as a result of background music incongruence. This prediction is based on the Cognitive Dissonance Theory proposed by Festinger in 1957 (Festinger, 1957). As previously mentioned in Chapter 2 (see Section 2.3.1), the source of the dissonance state can be directly related to the existence of conflicting cognitions and is then experienced as a psychological discomfort (Elliot & Devine, 1994; Festinger, 1957). Drawing from the definition presented in this study, the perception of congruence occurs when a consumer feels that the background music is inappropriate for the message as a whole. Thus, it is related to the cognition of *belief*, as mentioned by Festinger (1957), of an appropriate music for the context at hand (in this case the credit card commercial), and it will be compared with the cognition generated by the musical stimuli. When these two cognitions are inconsistent a certain degree of dissonance is expected to build up and it will be experienced as psychological discomfort (Festinger, 1957; Harmon-Jones, 2004; Harmon-Jones et al., 1996). Thus, the first hypothesis states:

H1: Incongruent music in an advertisement will generate incongruent cognitions, thereby increasing the felt psychological discomfort.

3.3.2 Effects on Cognitive Load

Hypotheses Two, Three, and Four examines the effects on cognitive load as a result of message complexity, music congruence, and psychological discomfort. Cognitive load represents the pressure exerted on the cognitive system (Sweller et al., 1998) of a consumer as a result of processing the elements of the advertisement as well as the resources demanded by resolving other cognitive states. As mentioned earlier, it also takes into account the capacity limitations (Chandler & Sweller, 1991; Lang, 2000) and the resources available for processing such elements at deriving these hypotheses.

3.3.2.1 *Message Complexity on Cognitive Load*

Cognitive load occurs with an interaction between information structures and knowledge (Paas & Merriënboer, 1994b) and especially increases with the number of independent units to be processed simultaneously (Sweller, 2010). Moreno and Park (2010) mentioned that the well-constructed schemas have the ability to act as the single element as it minimises the required cognitive resources as opposed to multiple elements. In the case of a complex message, the number of independent informational elements is higher than that of a simple message. Thus, it is expected that the demand for cognitive resources will be higher based on how they are presented.

Incorporating numerical figures in an advertisement message also demands more of the cognitive resources due to the demand for multiple processes. It was evident that numeric processing, such as spoken numbers, triggers phonological processing on top of numerical processing (lexical and syntactic processing) to understand the true meaning of numbers (Fias, Brysbaert, Geypens, & d'Ydewalle, 1996; McCloskey, Caramazza, & Basili, 1985) that could be identified as another form of structure or element. Hence, to simultaneously process and compare numbers, additional resources should be allocated from the existing pool of cognitive resources.

Furthermore, as opposed to self-paced media, where the consumer has the liberty of processing independent information elements in the message on his/her own pace (Lowrey, 2008), the externally paced media (such as radio and television) will force the consumer to process such elements as they present themselves. Since the media used in this study is externally paced, the consumer is left with no option but to process the

informational elements mentioned above simultaneously as they are presented. Considering this nature of the message stimuli, the following hypothesis is derived.

H2: A complex message results in a higher level of perceived cognitive load than does a simple message in an externally-paced media.

3.3.2.2 Music Congruence on Cognitive Load

Contrary to the incongruent music effect explained in Hypothesis one, it is predicted that congruent music will ease up the felt cognitive load. The explanation for this can be drawn from the perspective of the Gestalt Theory of Psychology (Macinnis & Park, 1991; Speck & Elliott, 1997; Wertheimer, 1938). Here, the congruence can be viewed as a set of elements complementing each other and thus, the complementary effects of message processing are expected to be in place with the use of congruent music in an advertisement. Some research in the area of music in advertisements has found that the music positively influences advertisement effectiveness, regardless of whether they address the congruence aspect in such research. Hargreaves and North (1997) called this the “Music Effect.” However, the music effect is considered to be positively related to the degree of felt congruence within the context of the advertisement.

In line with the Gestalt principles of psychology, congruent music and message trigger interaction and will process it as a “whole.” Thus, it can be argued that this would enhance the processing of a message, which Macinnis and Park (1991) referred to as “Emergent Meaning.” Therefore such effect is expected to reduce the cognitive load exerted by the other elements (e.g. informational elements) of the advertisement due to the complementary “music effect” brought in. Hence, the third hypothesis states:

H3: Congruent music will have Gestalt effects on message processing and hence will attenuate the felt cognitive load.

3.3.2.3 Psychological Discomfort on Cognitive Load

According to the literature reviewed in Chapter 02, it is apparent that the consumers may try to resolve the psychological discomfort experienced due to the presence of

incongruent music in the advertisement (Elliot & Devine, 1994). Such resolution is consequently expected to demand more of the cognitive resources than would otherwise be available for processing the advertisement message. Since cognitive load is a construct that inevitably acknowledges the notion of limited cognitive capacity (Chandler & Sweller, 1991; Sweller, 2010), the extra resources demanded to handle psychological discomfort is predicted to eventually increase the existing level of cognitive load. Therefore, the next hypothesis posits:

H4: The higher the psychological discomfort, the greater the demands for cognitive resources, which will thereby increase the felt cognitive load.

3.3.3 Formation of Attitude towards Advertisement

Hypotheses 5 and 6 predict the Attitude towards Advertisement as a result of felt psychological discomfort and cognitive load. In this context, only the formation of attitude towards the advertisement is considered as there is no prior attitude towards the attitude object and the manipulated advertisement stimuli.

3.3.3.1 Psychological Discomfort on Attitude

In line with the research in the attribution paradigm that considers dissonance as a psychological discomfort state (as opposed to an arousal state) (Clore & Schnall, 2005; Elliot & Devine, 1994; Harmon-Jones, 2000), the affect state generated by the discomfort may influence the attitude towards the advertisement. Consumers tend to relate the discomfort they experience to an identified possible source (Clore & Schnall, 2005; Eagly & Chaiken, 1993; Schwarz & Clore, 1988). In this case, the advertisement can be clearly identified as the source of the affect state.

Further, it is suggested in the literature that valence and arousal are two dimensions of affect (J. A. Russell, 2003) and since dissonance is regarded as experienced discomfort state, only the *pleasant* and *unpleasant* valence (Clore & Schnall, 2005) is considered. Based on the *attribution-affect* (J. A. Russell, 2003), which says that a person tries to link the feeling of pleasant/unpleasant state to a particular cause, the consequent psychological state is most likely to be linked to the experimental advertisement. As a

result, the prevailing affect state is predicted to be transferred as information to evaluate the identified source (Clore & Schnall, 2005). This is possible according to the *affect-as-information* hypothesis (Clore et al., 2001; Clore & Schnall, 2005; Schwarz & Clore, 1983), which states that the affective feedback provides guidance to the judgment process (Clore et al., 2001). Due to the absence of prior attitudes towards the treatment advertisement, there will not be any existing attitude-related cognitions to interfere in this process. As a result, the temporary mood state that exists would be directly transferred to the evaluative process. Thus, the generated Attitude towards Advertisement is expected to be negatively related. Accordingly, Hypothesis 5 states:

H5: Increased levels of dissonance experienced as psychological discomfort lead to negative valance of attitude towards advertisement.

3.3.3.2 Cognitive Load on Attitude

One of the perspectives of attitude, as explained in Chapter 02 (see Section 2.6.1.1), is the constructive perspective, which suggests that attitude formation is constrained by the cognitive capacity of the listener (Argyriou & Melewar, 2011; Forgas, 2010). Since consumers have limited cognitive capacity, the higher cognitive load generated by the target advertisement may spare few resources to construct a thorough response (Kruglanski & Thompson, 1999), thus causing inferential error (Forgas, 2010). Additionally, since the target advertisement is unfamiliar to the consumer, it is expected that it would exercise affect as the heuristic to derive attitude towards the advertisement (Schwarz & Clore, 1988; Slovic, Finucane, Peters, & MacGregor, 2007). Therefore, the result will be that he/she misattributes the affect stage to attitude. Thus, it is hypothesised as follows:

H6: When the perceived cognitive load increases, it will lead to negative valance of attitude towards the advertisement.

3.3.4 Cognitive Resource Pressure

Cognitive Load is expected to behave in a certain manner based on the combination of the type of music and the type of message in the advert. These combinations will consequently determine the cognitive resource requirement and utilisation. Such behaviour is expected based mainly on the fact that the congruent music in an advertisement has the ability to assist the message of the advertisement while the incongruent music hinder such processing (M. I. Alpert, Alpert, & Maltz, 2005; Hallam & Price, 1998; Hsuan-Yi & Nai-Hwa, 2010; Kellaris et al., 1993; North, Mackenzie, et al., 2004; Oakes & North, 2006; Yeoh & North, 2010, 2011). Furthermore, depending on the respective cognitive states generated by combining different complex messages with the congruent and incongruent music, the effect of cognitive load is expected to follow. In accordance with some of the research in the area of cognitive resource utilisation (e.g. Anand & Sternthal, 1989, 1990; Keller & Block, 1997; Lang, 2000), three main levels of cognitive load can be predicted: low, moderate, and high. The *low* and *high* levels are characterised by under and over demand of cognitive resources respectively, while the *moderate* level is characterised by an optimum condition for memory performance.

On the one hand, cognitive load is expected to be low with a simple message and to be high with a complex message for the reason that the processing requirements of the respective messages differ accordingly (see Section 3.3.2.1). On the other hand, it is also expected that congruent music will enable music effects that will be supportive of the advertisement processing (see Section 3.3.2.2), while the incongruent music poses distracting effects (Kellaris et al., 1993; North & Hargreaves, 1999; Oakes & North, 2006).

Accordingly, when congruent music is combined with a simple message (condition *SC*), it is predicted to result in a *low* state of cognitive load, while combining incongruent music with a complex message (condition *CI*) would result in a *high* state of cognitive load. The remaining treatment conditions, i.e., simple message with incongruent music (condition *SI*) and complex message with congruent music (condition *CC*) are expected to generate a *moderate* state of cognitive load. Therefore, the following sub hypotheses of Hypothesis 7 are derived:

H7: The effect on Cognitive Load is such that

H7a: SC has a lower effect on Cognitive Load than that of SI.

H7b: SI and CC have similar effects on Cognitive Load.

H7c: CI has a higher effect on Cognitive Load than that of CC.

3.3.5 Cognitive Resource Utilisation and Memory

Hypotheses 8 and 9 mainly pivot on the Resource-Matching (RM) Hypothesis (Anand & Sternthal, 1989) explained in Chapter 2 (see Section 2.5.3.2). It purports that the results will be superior at the point where the demanded cognitive resources match those available while the over and under demand for such resources would result in less optimum output. Thus, the relationship between cognitive resource utilisation and effectiveness is said to have an inverted “U” curve (e.g. Deitz, Myers, & Stafford, 2012; Hahn & Hwang, 1999; Keller & Block, 1997; Sicilia & Ruiz, 2010) because excessively available resources trigger the elaboration of idiosyncratic associations while the lack of resources tends to overload the system (Anand & Sternthal, 1989; Lang, 2000).

3.3.5.1 Cognitive Load on Immediate Memory

In line with the RM hypothesis, it is conceptualised that the low level of cognitive load will result in the first status explained in the hypothesis, that is, the abundance of cognitive resources to process the target advertisement. Consequently, as per the LC4MP this state of cognitive load is predicted to lead to weak encoding and retrieval of the advertisement-related information for the reason that abundance of resources would interfere with the encoding and storage processes (Lang, 2000) by processing non-advertisement related information (Anand & Sternthal, 1989; Keller & Block, 1997; Peracchio & Meyers-Levy, 1997). Therefore, the result is expected to be lower in recognition and recall memory respectively. On the contrary, the *high* level of cognitive load is predicted to hinder both encoding and storage processes due to inadequacy of resources to carry them properly (Anand & Sternthal, 1989; Lang, 2000). Especially considering the external-pace nature of the advertisement, these operations would be greatly affected as the encoding has to be done on a continuous stream of audio.

However, in the light of the RM hypothesis, the moderate level of cognitive load should provide an optimum level of cognitive resource utilisation. Therefore, as per the RM hypothesis and LC4MP, it is expected to facilitate the encoding and storage process better than that of the previous two levels of cognitive load. As a result, recall and recognition memory for an advertisement generating a *moderate* level of cognitive load is predicted to be optimum due to less interference from non-advertisement related processing with *encoding* and *storage* sub processors. This is also supported by some findings of research on the information overload paradigm (e.g. B. K. Lee & Lee, 2004; Lurie, 2004; Malhotra, 1982; Sicilia & Ruiz, 2010). Thus, taking the entire scenario into consideration, it is expected that the relationship between the cognitive load and the respective memory constructs will mimic an inverted “U” shape, in view of which, the following hypotheses is stated:

H8: The relationship between Cognitive Load and

H8a: Immediate Recall memory will mimic an inverted “U” shape.

H8b: Immediate Recognition memory will mimic an inverted “U” shape.

3.3.5.2 Cognitive Load effect on Delayed Memory

According to Ebbinghaus’ experiments, the retention rate of a series of words appeared to be approximately 33.8 % after 24 hours of the original exposure. This rate remains in the neighbourhood of 30% after 48 hours of the exposure and will display slower losses thereafter (see J. R. Anderson, 2000). In other words, the loss of memory will approximately flatten after 48 hours. Based on this rationale, the delayed test is conducted after approximately 48 hours.

In this context it is considered that immediate memory behaviour may not suffice for a complete study of memory as the information regarding the advertisement could be retrieved from the short-term memory. *Retention* and *retrieval* will be decided on the strength of association created as a result of encoding and storage (J. Brown, 1976; Lang, 2000). Using the same theoretical basis as in Hypothesis 8, it is predicted that the retention of the memory which is associated with the *moderate* level of cognitive load will be superior. This is due to matching demanded cognitive resources with those

available which will result in better encoding and storage. Memory will be retained and readily accessible when the number and strength of associations created with a specific node becomes greater (J. R. Anderson, 1996b; Fazio, Herr, & Powell, 1992; Krishnan, 1996; Lang, 2000), such as the brand name, product, and information structures of the message. The strength of the associations made is expected to be high with better utilisation of encoding and storage processes (Lang, 2000) and hence, retrieval after a certain period will also be possible. In other words, the greater the number and the strength of associations are, the more readily accessible become the contents of the advertisement. In contrast, under and over utilisation of cognitive resources associated with low and high states of cognitive load is expected to result in poor utilisation of these sub processes and may lead to a low level of retention and retrieval. Accordingly, the following hypotheses state:

H9: The relationship between Cognitive Load and ...

H9a: Delayed Recall Memory will mimic an inverted “U” shape.

H9b: Delayed Recognition Memory will mimic an inverted “U” shape.

H9c: The difference between immediate and delayed recall memory will be significant at low and high levels of cognitive load, but not at the moderate level.

H9d: The difference between immediate and delayed recognition memory will be significant at low and high levels of cognitive load, but not at the moderate level.

3.4 COVARIATE VARIABLES

In addition to the constructs outlined in the conceptual model shown in Figure 3-1, two covariates are also considered in this study: *Working Memory Capacity* and *Need for Cognition* of consumers. The remainder of this section explains the rationale for considering them.

3.4.1 Working Memory Capacity

Working memory is defined as a “System that can store information briefly while other information is processed” (Eysenck, 2012, p. 127) and it has been identified as

important construct in many of the cognitive operations, especially in the domain of learning and memory (e.g. A. D. Baddeley, 1992; A. D. Baddeley & Hitch, 1974; Eysenck, 2012; Jaeggi, 2008; Shipstead, Redick, & Engle, 2013). The literature on cognitive load also acknowledges that the construct itself is based on the concept of working memory and its utilisation (eg. Merriënboer & Sweller, 2005; Paas et al., 2004; Paas et al., 2003; Sweller, 2010). It is conceptualised that the entire model presented in the current study operates within the boundaries of working memory and thus, the differences in it which may exist among consumers may have an influence on the way the advertisement stimuli are processed. Further, it may affect the perception of cognitive load based on the premise that the attentional control is expected to be higher among those who have high working memory capacity and are less prone to distractions (Eysenck, 2012; Shipstead et al., 2013).

Similarly, it also appears that working memory may have an effect on long-term memory. One of the slave systems of working memory is the Phonological-loop which processes articulated information and stores them for a short period (A. D. Baddeley, 1992). Further, it also has a subsystem named the “episodic buffer” to link up with the long-term memory (A. D. Baddeley, 2000). Therefore, any differences in working memory capacity can also affect the process of encoding, storing and retrieving (Lang, 2000) the advertisement-related information from both the immediate and delayed memory.

3.4.2 Need for Cognition (NFC)

The second covariate considered in this study is Need for Cognition. Cacioppo and Petty (1982) define it as “...the tendency to engage in and enjoy thinking” (p. 116) and based on the literature, they proved the idea of people being enjoyable thinkers when they are high in NFC. It is also evident in the literature on advertising that advertisement-processing is positively related to NFC (e.g. Cacioppo et al., 1983; Dahlén, Lange, Sjödin, & Törn, 2005; Putrevu et al., 2004; Zhang & Buda, 1999). In this study, it is expected that a high level of NFC will process complex messages more effectively and attentively than a low level. For instance, improved advertisement processing and recall are associated with high scores of NFC (e.g. Peltier & Schibrowsky, 1994; Steenburg, 2012). Therefore, it is rather apparent that cognitive

load and memory are affected by the level of NFC. It is also believed that people who are high in NFC are less likely to be cognitively overloaded (Putrevu et al., 2004). Furthermore, Attitude towards the Advertisement also seemed to have a similar influence so that the high values of Need for Cognition results in a better attitude (Haugtvedt & Petty, 1989). Additionally, it is also suggested that those who are high in this tend to generate a stronger attitude than those who are low in it, who tend to engage in superficial processing (Petty, Briñol, Loersch, & McCaslin, 2009). Thus, Attitude towards Advertisement is also assumed to be affected by NFC.

3.5 CONTROLLED FACTOR

One participant centred controlled variable is considered (see Section 4.4 for other controls introduced) in this study that will potentially affect the results. It is the level of involvement with the experiment. This variable is mainly a contextual factor and is expected to be maintained at a high level across all experiment conditions.

3.5.1 Level of Involvement

Level of Involvement can be considered on the basis of what such involvement is associated with, for instance, involvement with product (e.g. Korgaonkar & Moschis, 1982; Lowrey, 2006; Petty, Cacioppo, & Schumann, 1983), brand (e.g. Macinnis & Park, 1991), and Message (e.g. Y. H. Lee, 2000; Muehling, Stoltman, & Grossbart, 1990; Petty & Cacioppo, 1979). The early literature identified such different uses of involvement (Antil, 1984 for review) that provoked some criticism (see Rothschild, 1984). However, for the purpose of this research, involvement is defined as “...the level of perceived personal importance and/or interest evoked by a stimulus (or stimuli) within a specific situation” (Antil, 1984, p. 204).

Hence, it is the involvement with the experiment identified as a factor to control, for the reason that it affects the way an advertisement is processed (Hawkins & Hoch, 1992; Muehling et al., 1990). Such affect is direct in some situations, and in other situations, it interacts with other factors. For instance, the perception of music-congruence is affected by the level of involvement in a way that only high involvement consumers will perceive the presence of music congruence (North, Mackenzie, et al., 2004). Park

and Young (1986) and Macinnis and Park (1991) showed the influence on recall and the route of processing based on the manner in which involvement interacts with the popularity and indexicality of the music respectively. Therefore, the way music in the treatment advertisement is perceived will tend to be influenced by the level of involvement of the participants. The literature also suggests that dissonance (e.g. Korgaonkar & Moschis, 1982), memory (e.g. Hahn & Hwang, 1999; Hawkins & Hoch, 1992; M. Lee & Faber, 2007) and the effects of psychological processes like attentional control (e.g. Greenwald & Leavitt, 1984) as well are affected by the level of involvement. Despite some criticism of not treating involvement as a continuous variable (see Antil, 1984), the current research also considered it from a dichotomous perspective and such consideration is unavoidable especially in an experimental research context (Rothschild, 1984).

3.6 CHAPTER SUMMARY

The aim of this chapter was to present the conceptual model used in this study. It began with a graphical representation of the model followed by a discussion of the conceptualised relationships among the constructs. All the hypotheses to be tested in the study were formally presented. Finally, the rationale for considering each covariate variable and the controlled factor were also discussed. The next chapter will present the operationalisation of the presented constructs and the procedure adopted for testing the hypotheses.

4 METHODOLOGY

4.1 INTRODUCTION

The nature of knowledge or *how we know what we know* is called epistemology, and it lays the theoretical foundation for research (Crotty, 1998). According to Crotty (1998), epistemology determines the theoretical perspective, which in turn leads to the methodology and method of research. This study was in accordance with such notions addressing the objective existence of knowledge that belonged to *objectivism* under epistemology. Further, the study was based on direct experience but not on the speculation of a person and thus it came under the theoretical framework of *positivism*. The methodology adopted here was experimental research for the reason that it had to be conducted in a controlled setting to regulate the effects of the other factors.

This chapter presents the methodology adopted in the current study. It begins with an explanation of the rationale behind selecting certain methods over others. Next, the procedure for selecting the experiment stimuli is explained followed by the instruments used to measure the 11 constructs, including the two covariates, used in this study. The pre-testing procedure for selecting and finalising the stimulus materials are then summarised before explaining the entire procedure covering all the sections of the two stages of the experiment.

4.2 OVERVIEW OF THE DESIGN

The main objective of this study was to discover the influence of background music on the effective communication of an advertisement message by way of forming advertisement-related memory and how it affect the overall evaluation of the advertisement. In such a context, it was important to investigate the way that music congruence and message complexity in an advertisement affect the cognition of consumers.

As mentioned in Chapter 1, the way cognitive resources were utilised as a result of salient stimulus characteristics (congruence and complexity) on processing an

advertisement and the subsequent effects of such processing on consumer response to advertisement were among the main study objectives.

A retrospective study to achieve the above objectives would be less applicable for several reasons. One reason would be that consumers remember advertisements and their messages not predominantly due to the above factors but also due to some other reasons. Hence, the variations may also be influenced by random effects and it may not be easy to isolate the effects of the relevant factors. Even though a person has meta-information relating to an advertisement, it would be highly unlikely for him/her to explain the effects of the above factors separately. Thirdly, it may also be very difficult for a normal person (a consumer) to explain the cognitive effects of any stimuli without systematic scrutiny. Should such explanation be given, it may be more idiosyncratic than scientific.

Controllability of the external factors was important for the present study. As mentioned earlier, a consumer's memory and evaluation of an advertisement can easily be influenced by other factors like the contents of the advertisement, environmental factors and the psychological status (see Schiffman & Kanuk, 2002). For instance, the pictures, colours, brand names, and already existing experience regarding a product may interfere with dependent factors during the investigation, if other factors are not adequately managed

Therefore, a prospective approach was adopted as the study needed a controlled environment to measure the effects under investigation. In this case, the experimental groups should be exposed to specifically manipulated stimuli to minimise the confounding effects for testing the hypotheses. However, one of the shortcomings of such a methodology was that the internal validity of the study would be increased at the expense of external validity (see Shadish, Cook, & Campbell, 2002). Therefore, certain measures were taken in the design to increase the degree of external validity of the outcomes. The following section explains briefly the research method used for the proposed experiment.

4.2.1 Experiment Design

The design of this study was 2 (High / Low Music-message congruency) x 2 (High / Low Message complexity) between-subjects and 2 (immediate / delayed testing occasion) with-in subject mix design.

On the one hand, (a) differences between groups and (b) differences between participants within a group (confounding with-in group) are two of the main issues associated with between-subject design (Kantowitz, Roediger III, & Elmes, 2005). On the other hand, with-in subject design does not have the above limitations because all the treatments are applied to individual subjects in contrast with applying a single treatment to a group. However, this study could not be administered in an entirely within-subject design for the following reasons:

- a) *Asymmetric transfer* effect being in place especially with message complexity. When the two manipulations of music were presented with the same message, there would be re-reading of the same message multiple times leading to contamination of memory and other perceptions.
- b) *Practice-effect* interfering in such a manner that the subjects would become familiarised with the presentation of the message to a great extent and music to some extent.

Therefore, between-subject design for exposing participants to the treatments was adopted while the memory tests were within-subject. Further, the participants were randomly assigned to each manipulation group. By doing so, it was assumed that the groups of each treatment would have minimum differences.

4.2.2 Selection of Stimulus Material

This experiment had two main factor manipulations: background music and message complexity. The selection of these stimulus materials was done through a series of pretests. In each pretest, an alternative set of stimulus materials was tested and based on the findings, only some were selected for the next level of testing while the others were dropped. The next section of the chapter explains the basis for the manipulations used in the present experiment.

4.2.2.1 Product Category and Brand Name Selection

The type of product used in this study was the credit card. It was considered to be lifestyle regulating technology in most consumer contexts (Matthew J. Bernthal, David Crockett, & Randall L. Rose, 2005) and Statistics New Zealand reports the use of electronic card transactions from August 2013 to August 2014 to be approximately NZD 72.5 billion across all industries (Statistics New Zealand, 2014).

The main reason for the use of credit cards in this study was that it indicated a moderate level of involvement and was regarded as part of everyday life for most people. On the other hand, the advertisement message of such a product could easily be manipulated for complexity. Furthermore, advertisements of financial services constantly need to communicate the interest rates and other related benefits commonly in the form of numbers, which make the messages more complex. Since products of financial institutions are intangible, they have to increasingly rely on the information communicated through their advertisements to convince consumers of their value.

In New Zealand alone, there are about 110 variants of credit cards offered by various organisations including banks and financial companies (interest.co.nz, 2014). Thus, it is apparent that the banks tend to promote their own brand names through these credit cards by introducing attractive interest rates and reward systems. However, the use of existing brand names may activate the brand-related schema information in the minds of participants that may interfere with the new information presented through the experiment adverts and attitude towards advertisement to a great extent. Therefore, with the purpose of minimising potential contaminations, a brand name for this research was invented. Further, whilst being different from familiar brand names, it should also be simple enough to process. That is, the brand name should not demand a lot of cognitive resources to process it. Therefore the name that was chosen for this study was “MAX BANK.”

4.2.2.2 Message Manipulation

As mentioned in Chapter 02, the complexity of the message stimuli could be manipulated with several factors (see Section 2.4.4). In this research context, however, it was considered that the contents of the messages should be in line with the

information a financial organisation, such as a bank, would want to communicate their prospects with. Therefore, message complexity was manipulated mainly from two aspects: *number of product attributes* and *numerical reasoning*. These aspects are commonly observed in advertisements of financial services, for instance, in credit cards, home loans, investment loans, and term deposits. Therefore, it was decided to incorporate these characteristics in the respective simple and complex messages to make them more representative of the real messages. The remainder of this section explains each aspect.

4.2.2.2.1 Information Structures - Number of Product Attributes

The number of product attributes was one of the commonly manipulated characteristics in the literature in the area of information load (e.g. Jacoby et al., 1974; Malhotra, 1982; Sicilia & Ruiz, 2010). In this research, the two levels of complexity manipulation were obtained by using the number of attributes a single message carried. Thus, a simple message (low complex) had fewer information structures (attributes) to communicate than its counterpart. The exact number of attributes was determined by the results of the pretest (see Appendix 1.1, p. 246). However, it was expected to use one to two attributes in a low complex message and three to four in the other. Though Malhotra (1982) noted that information overload happens with 15-20 attributes, his research mainly focused on arriving at purchase intention. Since the present research intended to measure memory performance and attitude as the response, it was assumed that the number of attributes of such magnitude would hinder memory. It should also be noted that the purpose of this manipulation was not to overload the subjects with the information, but to increase the level of cognitive resource demanded to process and internalise the contents of the message with regard to high and low levels of complexity.

4.2.2.2.2 Numerical Reasoning

The evaluation of numbers in mind needs additional attention and processing and thus will be perceived as more complex. As mentioned in Chapter Three, numbers require different processing, such as numerical and phonological processing (e.g. McCloskey et al., 1985), to take place simultaneously in order to understand the message properly. Thus, incorporating numerical figures would increase the level of perceived difficulty.

Accordingly, the product features (in this case interest rates and charges) were compared with the existing solutions of the market place to claim its difference. These comparisons were again done with the market solutions already prevailing without drawing an association with the existing brand names. Furthermore, such comparisons were done on an individual attribute basis.

Table 4-1 summarises the different levels of manipulations considered in this study as the basis for achieving the intended levels of message complexity.

Table 4-1 - Summary of Message Characteristics for Complexity Manipulation

Characteristic	Low-Complex	High-Complex
Brand Knowledge	New	New
Product Attributes	One – two	Three - four
Numerical reasoning	Not included	Included

4.2.2.2.3 Developing Messages

Included in the aforementioned characteristics were six messages that were initially developed and they are shown in Appendix 2.1 (p. 272). The brand name, Max-Bank, appeared three times in every message. After a series of pretests, the most appropriate message set (Simple and Complex) was selected for the final study. Prior to studio recording, the flow of the messages was adjusted by a professional script writer (see Appendix 2.2, p. 273 for the final scripts). The complete pretesting procedure is presented in Section 4.5 of this chapter.

4.2.2.3 Music Manipulation

The other main manipulation done in this study was musical stimulus. Only the background music was considered and it was treated as a supportive cue in the advertisement. As mentioned earlier in Chapter 2 (see Section 2.2.4.2), background music can have either a vocal element or just the instrumental element only. Vocal music requires lexical processing (see Salamé & Baddeley, 1989; Wallace, 1991) and it could create a psychological state that falls outside the scope of this study. Hence, only the background instrumental music was taken as the musical stimuli.

Music-message-congruence¹ is defined as the relevance or the appropriateness of music to the central advertisement message (Allan, 2006) and the current study also considered it from the same perspective. Section 2.2.4.5 of Chapter 2 captures certain perspectives of the concept of congruence manipulation. The most commonly adopted methods are in accordance with the Expectancy-Relevance perspective (Heckler & Childers, 1992) and the musical evoked imagery or emotions perspective (Kellaris et al., 1993; North, Mackenzie, et al., 2004). However, the current study deviated from these two perspectives of operationalisation mainly for the following reasons:

- a) Expectancy-Relevance depends on currently existing mental schemas related to the advertised brand or the advertisement itself. This study used unfamiliar brand names with unfamiliar music to minimise the existing schema-related processing influence on cognitive sub processes and the process of evaluative judgment.
- b) Evoked imagery or the emotions may also have a similar interference effect. For instance, the storage sub-process would be influenced by the existing associations and emotions triggered by music. However, one of the objectives of this study is to investigate the effect of cognitive load on these sub-processes. Hence, to minimise the other forms of processing interference, evoked imagery of music as a means of operationalising congruence was avoided.

Therefore, music congruence was conceptualised from the Gestalt perspective and it was intended to generate such effects in the consumer's mind. Rather than manipulating individual physical characteristics of music, or associating message and music through musically evoked imagery, participants' overall perception of congruence was considered. Further, music congruence manipulation was largely subjective (Macinnis & Park, 1991) and therefore, structural characteristics such as tempo or pitch were not taken into consideration either. It was for this reason that the selection of appropriate stimuli was done in two main stages. The first was to categorise musical snippets into two categories -congruent and incongruent- after taking the message into consideration. This was done by the researcher and a judge with knowledge of marketing and

¹Hereafter congruence and music-congruence will be used interchangeably to refer music-message-congruence.

advertising. The second was to conduct a pretest on the pool of snippets chosen to categorise music into the respective levels of manipulation.

4.2.2.3.1 *Selection of Music*

The initial selection of music snippets for pretesting was primarily, but not restrictively, for the above mentioned reasons based on the stereotypes of music genres. Rentfrow and Gosling (2003) identified four dimensions of music preference: reflective and complex, energetic and rhythmic, intense and rebellious, upbeat and conventional and classified 14 popular musical genres into these four dimensions. Accordingly, the initial selection of music snippets was done using these genres as a guideline. However, it should be noted that congruence manipulation was not based on the stereotypes of music but rather it was used as the basis for initial selection. Hence, by considering the nature of the present day use of credit card, the first two dimensions mentioned earlier were considered as congruent music while the other two dimensions as incongruent music. Accordingly, classical, jazz, soul / funk, and electronic were categorised as congruent while alternative, metal, country, and religious were categorised as incongruent.

Keeping this as the base line, 16 music snippets were originally chosen for each congruent level. However, the researcher exercised his judgement to pick four snippets after listening to each music snippet along with pre-recorded messages. Finally, based on the results of the pretest (refer Appendix 1.2, p. 257), the music snippets shown in Table 4-2 were selected to be finally mixed with the finalised audio messages.

Table 4-2 - Profile of Music Snippets Used in the Experiment

	Congruent Music	Incongruent Music
Title	To Stay or Go	So What
Composer	Josh Smith	Jose Pasquini
Genre	Funk / Soul	Metal / Rock
Instruments	Bass (electric), Drum, Piano, Trumpet.	Drum, Guitar (electric), Bass (electric)

4.2.2.4 Development of Experiment Advertisements

Consequent to selecting two messages and two music snippets for complexity and congruence manipulations respectively, the four treatment advertisements were produced. The messages were recorded in a professional recording studio and read out by a professional vocalist. Then, the selected music was mixed with the respective messages by using audio-mixing software. The volume levels of all the music snippets were set to the same level to avoid different levels of sound attracting undue attention from the participants. Similarly, the sound levels of the distracting advertisements were also normalised to meet the same requirement before mixing them into a single audio file. There were one second and 50 millisecond gaps inserted between two advertisements to make them prominent as separate adverts. A description of distracting advertisements is presented in Table 4-3.

Table 4-3 – Description of Distracting Advertisements

	Advertisement 1	Advertisement 2
Brand name	Argos	Toyota
Background music	No music but ocean sound.	No music but small melody at the end of the advertisement.
Duration	30 seconds	20 seconds
Product	Garden furniture	Shortest four-seater car.

4.3 RESEARCH INSTRUMENT DEVELOPMENT

The following section presents the questionnaire development process. In addition to the measurement instruments, the calculation procedures of some measures are also discussed. First, the two factors, perceived message complexity and perceived music congruence, are presented followed by the two processing variables, Cognitive Load and Psychological Discomfort. Next, the affective response variable, Attitude towards Advertisement, and four cognitive response variables, Immediate Recall, Immediate Recognition, Delayed Recall, and Delayed Recognition are presented. Finally, the two covariates, Need for Cognition and Working Memory Capacity, are described.

4.3.1 Independent Measurements - Manipulation Checks

Two measures -Perceived Message Complexity and Perceived Music Congruence- were used for the manipulation checks. They were also used as independent variables for some aspects of the analysis such as path analysis.

4.3.1.1 Message Complexity - Subjective Indicator

Message complexity is largely a subjective construct though objective measures are commonly administered in many experiments used to measure it (e.g. Lowrey, 1998, 2006; McDaniel, 1981). Thus, by considering the aspects addressed in the definition of complexity adopted for this study (see Section 2.4.1), it was decided to use a subjective indicator to measure complexity. For this purpose, a new scale was adopted by referring to two existing scales. The first scale ($\alpha = .82$) was developed by Tybout, Sternthal, Malaviya, Bakamitsos, and Park (2005). However, the intention of their study was to measure the ease of driving a car, which was a perception of an action and for this reason, the scale was adopted after making some changes in it. The second scale ($\alpha = .81$) was developed by Wheeler, Petty, and Bizer (2005) to measure the processing effort involved in an advertisement message.

Considering the items in the above two scales, the scale displayed in Table 4-4 was developed to measure the perceived level of complexity of the advertisement message. All the items in this scale were on a seven-point agreement scale. It should also be noted that the wording of the scale appearing below was formulated after incorporating some of the changes identified in the pretesting process. Hence, the wording of the same scale appearing in the pretesting section is slightly different.

Table 4-4 - Perceived Message Complexity Scale

#	Items(1=Strongly Disagree and 7=Strongly Agree)
DF1	The content of this advertisement was complex.
DF2	I had to keep track of many things in my mind to understand the contents of this advertisement.
DF3	The message of this advertisement was simple. (*)
DF4	There were many parts to the message of this advertisement.
DF5	The message of this advertisement conveyed lots of information.

* Reverse questions.

4.3.1.2 Music Message Congruence

As it is with perceived complexity, perceived music congruence is also predominantly a subjective construct. Despite the similarity of the congruence manipulation done in the study of Kellaris et al. (1993) ($\alpha = .92$), a slightly improved version ($\alpha = .95$) by Mantel and Kellaris (2003) appeared to be more relevant and it was therefore adopted for this study (see Table 4-5). The alternative scales used in the other studies of congruence (e.g. Ellen & Bone, 1998; Macinnis & Park, 1991) appeared to be not fully consistent in the context of this study.

The items of this scale shown in Table 4-5 were also on a seven-point agreement scale anchored from 1 (strongly disagree) through 7 (strongly agree).

Table 4-5 – Perceived Music Message Congruence Scale

#	Items (1=Strongly Disagree and 7=Strongly Agree)
MF1	The background music used in this ad was appropriate for the contents of the advertisement.
MF2	The music in this advertisement did not seem to fit with the message. (*)
MF3	The music in the advertisement did not match the product in the advertisement. (*)
MF4	The music in the advertisement was congruent with its message.

* Reverse questions.

4.3.2 Cognitive Load, Psychological Discomfort, Attitude towards Advertisement

4.3.2.1 Cognitive Load

On the basis of the definition of cognitive load and the nature of this experiment, a subjective measurement scale was used to measure this construct. There are a few

methods suggested in the literature for this purpose. For instance, Rubio et al. (2004) evaluated three subjective mental work load evaluation techniques and reported that there was no significant difference between the intrusiveness of the instruments. Of the three, Workload Profile (WP) requires a dual task technique to evaluate the load, while the Subjective Workload Assessment Technique (SWAT) requires relatively complex steps to administer the test. Thus, both WP and SWAT were deemed unsuitable for the study at hand. On the other hand, the single item scale introduced by Paas and Merriënboer (1994b) does not capture all the aspects of cognitive load. Therefore, the NASA-Task Load Index (TLX) was considered to be more relevant in the current context.

The original NASA TLX contains six items to obtain six aspects of cognitive load (Hart & Staveland, 1988). They are mental demand, physical demand, temporal demand, performance, effort, and frustration. A few changes were introduced to the original scale to fit the context of this research. First, the item addressing physical demand was removed as it was irrelevant. Second, all the items were slightly reworded to match the scale descriptors used in this study. The final scale utilised is displayed in Table 4-6.

Table 4-6 - Cognitive Load Scale

#	Items (1=Strongly Disagree and 7=Strongly Agree)
CL1	I had to put some mental effort to understand this advertisement
CL2	I had to think hard to understand the contents of this advertisement.
CL3	The pace of this advertisement was hurried or rushed.
CL4	I was successful in understanding the contents of this advertisement.
CL5	I was irritated / annoyed because of this advertisement.

4.3.2.2 Psychological Discomfort

The psychological discomfort in the present context was expected to be experienced due to inconsistent cognition generated by the incongruent music and the predictions were derived in the light of Cognitive Dissonance Theory. Therefore, the scaled developed by Elliot and Devine (1994) was deemed to be more relevant. The scale was pivoted on the psychological discomfort aspect of the cognitive dissonance originally delineated by Festinger (1957) and to capture such aspect, they used the words

uncomfortable, bothered, and uneasy ($\alpha = .81$). However, the phrase “This advertisement made me feel...” was added to make the items consistent with current experiment. The scale items are shown in Table 4-7.

Table 4-7 – Psychological Discomfort Scale

#	Items (1=Strongly Disagree and 7=Strongly Agree)
CD1	This advertisement made me feel uncomfortable.
CD2	This advertisement made me feel bothered.
CD3	This advertisement made me feel mentally uneasy.

4.3.2.3 Attitude towards Advertisement

Due to its popularity, there are a large number of scales available to measure attitude towards various objects. Though the exact origin of it was not traceable (G. C. Bruner, 2009), one of the most commonly used scales to measure Attitude towards Advertisement (General) had 46 bi-polar items. However, for this research, the items that were adopted by Kellaris et al. (1993) ($\alpha = .88$) were used for the reason that the background music was considered in both studies. Further, the items used in this scale are similar to the psychological dimensions of attitudes explained by Ajzen (2001). The scale used in this study consisted of 7-point bi-polar items as listed in Table 4-8. The same scale is also used in other studies as well (e.g. Chattopadhyay & Nedungadi, 1992; $\alpha = .86$).

Table 4-8 - Attitude towards Advertisement Scale

#	Items
ATT1	Good / Bad
ATT2	Interesting / Boring
ATT3	Pleasant / Unpleasant
ATT4	Likable / Unlikable

4.3.3 Recall and Recognition Memory

Of the four memory measures, two were administered immediately after the treatment while the other two were conducted as the delayed memory test 48 hours after. This section of the chapter presents a detailed explanation of the procedure of collecting data and calculating the respective memory scores.

4.3.3.1 Recall Memory

Recall memory is more sensitive than recognition memory (Singh, Rothschild, & Churchill, 1988) for the reason that the former requires a greater threshold of strength than the latter (J. R. Anderson & Bower, 1972). Therefore, both immediate and delayed recall tests were carried out before the corresponding recognition tests to avoid possible contamination (Robinson & Roediger, 1997).

Participants were asked to recall the category / product, brand name, and as many parts of the message as possible. For this purpose, three separate questions were asked. Since, the target advertisement was intended to be disguised, the participants answered the aforesaid questions having considered all three advertisements and only the answers related to the target were extracted for the final score. The respective questions are listed in Table 4-9.

Table 4-9 - Immediate / Delayed Recall Test

#	Items
CRCL	Please recall and list down what products were advertised in the advertisements of this study. e.g. Chocolate
BRCL	Please write down any brand names you can recall from these advertisements.
MRCL	Please take a moment to recall as many parts of the message as possible from the advertisements you listened to in this study.

The recall score was calculated according to the marking scheme in Appendix 5 (p. 304) and two independent judges who were blind to the research objectives marked the scripts. The answers given by the participants to these questions were categorised based on each question and the message treatment group that each belonged to. Then, the copies of such answer sheets were given to each marker with clear instructions on how to mark. Accordingly, two markers marked the scripts and the marks were written under each unique user identification number (this number was generated dynamically by the system and assigned to each participant to identify the responses). These scores were eventually averaged to obtain the final scores.

One of the challenges of any study investigating the differential messages is to transform the scores to make them comparable. To do this, a two-stage process was adopted. First, the scores were converted to a percentage mark that would indicate the

proportion of correct answers. Thus, the recall scores in Chapter Five denotes the proportion of correct answers. Second, these scores were then standardised separately to standardise the differential variances for making them comparable (see Field, 2009).

4.3.3.2 *Recognition Memory*

A list containing parts of the target advertisement, distracting advertisements, and advertisements not included in the study, was displayed to the participants for choosing whether or not they heard such contents in any advertisement in the study. To test this ‘old-new method’ was used (e.g. Hicks & Marsh, 2001; Lindsay & Johnson, 1991) by forcing the participants to state their response by clicking on either “Yes -Heard this” or “No -Didn’t hear.” The list contained 22 items, of which seven came from the target advertisement, six from the distracting advertisements, and the remaining seven were not included in any of the advertisements.

Next, recognition memory score was calculated for each participant based on the answers they gave to the above test. The score was determined by Recognition Sensitivity and was denoted by d' (pronounced as d-prime). The traditional way of averaging the scores does not have a way to eliminate guessing and thus the values would not reflect the actual level of sensitivity to the memory traces of the target advertisement (Cradit, Tashchian, & Hofacker, 1994; Singh et al., 1988). Thus, the framework of *Signal Detection Theory* (Green & Swets, 1966) was adopted to calculate sensitivity to minimise the judgement biasness. Accordingly, stimulus items were divided into two – the *target* and the *lure*. The target was a stimulus that the participants were previously exposed to while the lure was a distracting stimulus. The respondents then marked a particular stimulus either as “Old” if they recognise the stimulus, or as “New” if they don’t. Consequently the responses were matched with the actual stimulus and they were categorised into recognition outcomes as shown in Table 4-10.

Table 4-10 - Recognition Outcomes

	Target	Lure
“Old”	Hit (Ht)	False Alarm (Fa)
“New”	Miss (Ms)	Correct Rejection (Cr)

[Source: A.D. Baddeley, Eysenck, Anderson, and Anderson (2009, p. 184)]

The hit rate (Hr) was calculated (see equation 4-1) as a fraction of targets (Ht + Ms). and the false alarm (Fr) rate was calculated (see equation 4-2) as a fraction of lures (Fa + Cr). Both target and lure have their own Gaussian distributions (Stanislaw & Todorov, 1999) and thus, the d' value was determined by taking the distance between the signal-distribution and the noise-distribution into account. Accordingly, the better recognition would be characterised by greater distances between the two (see Stanislaw & Todorov, 1999). This was calculated as shown in equation 4-4.

$$Hr = \frac{Ht}{Ht + Ms} \quad 4-1$$

$$Fr = \frac{Fa}{Fa + Cr} \quad 4-2$$

$$d' = \phi^{-1}(Hr) - \phi^{-1}(Fr) \quad 4-3$$

However, when the probability values become 0 or 1 with respective Hr and Fr, it will result in $-\infty$ and $+\infty$ respectively. To avoid such an error, an extreme value replacement technique was adopted (Macmillan & Kaplan, 1985). Accordingly, 0 was replaced with $(0.5 \div n)$ and 1 was replaced by $[(n - 0.5) \div n]$, where n was the number of targets and lures.

$$Hr|Fr = \begin{cases} 0.5 \div n & Hr|Fr = 0 \\ (n - 0.5) \div n & Hr|Fr = 1 \end{cases} \quad 4-4$$

Because the items of lure advertisements were identified as signals by the participants, such items were disregarded in determining d' . Thus, the total number of items (both target and lures) taken into account was 14.

In order to perform these calculations with greater accuracy and consistency, it was decided to develop a computer macro programme in MS Excel Visual Basic especially for this purpose. The code for the programme is given in Appendix 11.1 (p. 334).

4.3.3.3 *Delayed Memory Response*

Nonetheless, there were a few issues which needed to be addressed in order to minimise the contamination of the actual effects under investigation. One such was that if the same questions were used as in the immediate memory test, such questions would have a higher probability of acting as a retrieval cue. It would be higher for the recognition memory due to its sensitive nature. Secondly, if subjects were told that they were going to be tested on memory, they would be inclined to rehearse the contents of the advertisements (Roehm, 2001). This constant reactivation of memory associations would result in response biasness. To minimise these effects, the order of the items in the delayed recognition test was changed without changing the items. This way, the comparability of two tests was maintained. As a solution to the second issue, the participants were informed that they would be contacted after approximately two days to evaluate the process of the experiment without revealing the actual objectives.

4.3.4 Covariates Measures

As mentioned in Chapter 03, there were two covariate measurements obtained in this study: the Working Memory Capacity of the participant, and Need for Cognition (NFC). The following section describes the measurement procedure for each.

4.3.4.1 *Need for Cognition*

Chapter 03 purports the influence of NFC on cognitive load, attitude towards advertisement, and Memory. A scale comprised of 18 items was developed by Cacioppo, Petty, and Kao (1984) for measuring NFC and since then, abbreviated versions of the same were also used (e.g. Ailawadi, Neslin, & Gedenk, 2001; Cotte & Wood, 2004). Considering the nature of this experiment, the abbreviated scale composed of five Likert scale items proposed by Cotte and Wood (2004) ($\alpha = .73$) was adopted. This scale used all the reversed items and the only single item that was not

reversed was made so by adding the word ‘not’ (Cotte & Wood, 2004). Table 4-11 shows the items used in this study.

Table 4-11 - Need for Cognition Scale

#	Items (1=Strongly Disagree and 7=Strongly Agree)
NFC1	I would rather do something that requires little thought than something that is sure to challenge my thinking ability.
NFC2	I try to anticipate and avoid situations where there is a likely chance that I will have to think in depth about something.
NFC3	I only think as hard as I have to.
NFC4	The idea of relying on thought to make my way to the top does not appeal to me.
NFC5	The notion of thinking abstractly is not appealing to me.

4.3.4.2 Working Memory Capacity

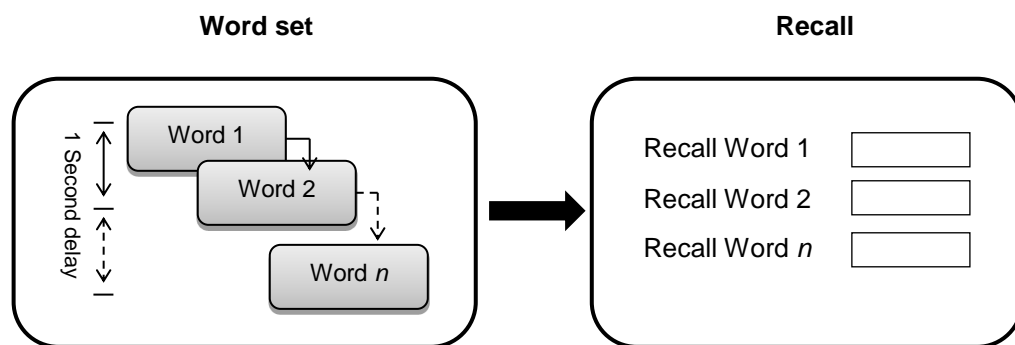
Working Memory Capacity (WMC) was measured by employing modified Simple Span Task (Conway et al., 2005; Turner & Engle, 1989) that used 30 items in six word-sets (see Appendix 6, p. 309). The words used in this study were similar to the word list used in the studies by Engle, Tuholski, Laughlin, and Conway (1999) and Lin (2007), and fulfil the need to have (a) concrete nouns, (b) two syllables, and (c) diverse semantic categories (Lin, 2007). Such characteristics minimise the chance of assisting recall and thus, the participants have to hold each word of a given word-set in his/her working memory for future recall.

Simple Span Task typically employs word-sets ranging from two to seven words in length (Turner & Engle, 1989). However, having considered the objective of measuring WMC as a covariate, only three sets were adopted in the current study. Accordingly, two of three, five, and seven word-sets were used.

The six sets (2 x 3) in the actual test were presented randomly except for the first set. A set with three words was fixed at the beginning and the rest of the five sets were randomised. The reason for this was not to load the participants with a larger word set in the first instance. A word in each set was presented to the participants with a delay of one second and at the end of each set, the participants were asked to recall all the words

appearing only in that set in the correct sequence. Each word in the list was auto advanced by a one-second delay and participants were unable to go back to the words already displayed. They were also instructed to recall only the words they could in the event they failed to recall all the words in that set. However, they were required to type the recalled words in the correct place in the sequence (see Figure 4-1).

Figure 4-1 - A Word Set and the Recall Phase of Working Memory



Finally, the working memory capacity for each participant was calculated. However, there were four possible ways to determine this score based on the following considerations (see Conway et al., 2005);

- a) Whether credit was given to partially correct items in a list or all items had to be recalled in the correct serial position (*partial-credit* vs. *all-or-nothing*).
- b) Whether the load carried by the items in a long word-list was to be accounted for, or equal weight was to be given across all items. For instance, a higher load would be carried by the items in a list of seven words than in a list of three words (*unit scoring* vs. *load scoring*).

Accordingly, the four alternative methods to be considered were: partial-credit unit scoring (PCU), all-or-nothing unit scoring (ANU), partial-credit load scoring (PCL), and all-or-nothing load scoring (ANL). However, Conway et al. (2005) showed that PCU was the most preferred method over the other three. Therefore, PCU was adopted as the scoring procedure for calculating WMC of each individual participant.

Firstly, the given answers were compared against the original list of a word-set to check whether they were correctly recalled in the correct serial position. In case of meeting both these conditions “1” (or “0” otherwise) was assigned to each item. Then, the sum of these marks was divided by the length of the words-set to get the score for that word set. Finally, the sum of all such scores was divided by the total number of word-sets to obtain the final score for each participant (see equation 4-5).

$$WMC = \frac{\sum_{i=1}^n \frac{\sum_{j=1}^{|\omega_i|} c_j}{|\omega_i|}}{n}$$

Where;
 n = number of word sets
 $\omega_i = i^{th}$ word set
 c_j = answer to the j^{th} item {1 or 0}

4-5

A macro programme was developed in MS Excel for this purpose too, in order to carry out the aforementioned procedure with greater accuracy and consistency (see Appendix 11.2, p. 337).

4.3.5 Demographic Measures

Demographic information was collected through five questions and they were related to musical orientation, music preference, radio listening hours, gender, and age. These questions are listed in Appendix 4.8.

4.4 CONTROLS

The controlled variables were necessary to isolate the effects of the background music on various cognitive processes and memory. They were level of involvement and motivation, placement of the advertisement, visual stimulation, product category, and music placement.

- *Placement of the advertisement*

The experiment advertisement was placed with two other distracting advertisements. The position of the advertisement was fixed in the first place across all the groups. A possible counter argument for such placement would be drawn from the serial position

effect (Murdock, 1962), which suggests that *primacy* and *recency* would be in effect for the items placed in the first and later parts of a list. However, this experiment disregarded this notion based on (a) such effect would be in place for longer lists and, in this case, it was only three adverts; (b) the other two advertisements were intended to be used as lures in such a way that there would be some kind of activity between the target advertisement and the memory test; and (c) to rule out any guesses that the participants may make on the advertisement in the middle that may bear some significance.

- *Unimodal stimulation*

It was found on many occasions that multimodal stimulation would utilise different modality specific resources to process signals (e.g. Buchweitz, Mason, Tomitch, & Just, 2009; Bushara et al., 1999; Ruchkin et al., 1997) that would raise concerns outside the scope of this research. Therefore, considering the nature of the hypotheses being tested here, it was decided to use auditory stimuli only in order to make it unimodal. Furthermore, not only would visual stimuli in an advertisement grab the attention, but also tend to be more influential. Thus, it would be inevitable to avoid memory of the message being influenced by the memory activations through such visual stimuli and therefore, the effects of the manipulations may be contaminated. In addition, other forms of stimulation were disregarded for the reason that the context of the present study is radio advertisements.

- *Product category*

Different product categories have different levels of consumer involvement (Kotler & Armstrong, 2008) and varying levels of involvement may pose an interest in certain group of subjects in the sample. To minimise such a situation, it was decided to choose a product category which might have a common interest for everyone but where the complexity of the message can be manipulated easily. Thereupon, treatment adverts in this experiment was chosen to be on financial services.

- *Background music*

As mentioned in Chapter Two, the use of music in ads can be either foreground or background music. When used as a part of the expressed message such as a sung message, music becomes the foreground in an advertisement. Thus, one cannot be

identified without the presence of the other due to the integral nature of those stimuli (Lantos & Craton, 2012). On the other hand, music is considered as background when detached from the expressed message and the stimuli can be separately identified. Therefore, in this experiment, only background music was used.

- *Instrumental music*

Background music in an advert can be instrumental, vocal, or both. However, the vocal component of music was found to have a distracting effect on the message being processed for the reason that (a) resources specific to the vocal modality had to be shared (Crawford & Strapp, 1994; Salamé & Baddeley, 1989), and (b) the vocal parts of the music may prime certain memory (Johnson & Halpern, 2012; Peretz, Radeau, & Arguin, 2004) related to lyrics that would pose a competition for the resources in the working memory. With the intention of avoiding these influences, only instrumental music was used.

- *Music placement*

Place of the music in an advert stimulate orienting-response effects (Brooker & Wheatley, 1994; Lang, 2000). For instance, it may bring in lead-in and highlighting effects on the message being presented (Brooker & Wheatley, 1994). To minimise any such biasness, the experimental adverts had music throughout the entire advert acting as a wrap for the message.

- *Involvement with the Experiment*

The literature pertaining to music and message complexity acknowledged involvement as an influential factor. Furthermore, it could affect memory in such a way that a high level of involvement could result in better memory than a low level due to elaboration (see Section 3.5.1). Therefore, the level of involvement with the experiment was maintained at a high level by including the following text before they were exposed to the experimental advertisements. The word “evaluation” was purposefully omitted with the purpose of creating a less stressful test environment.

“The three radio advertisements used in this experiment are considered to have unique characteristics that are highly regarded by many scholars and advertisers around the world. Therefore, please listen to each ad attentively and tell us honestly how you feel about them.”

In order to check whether such control was achieved to the expected level, participants were asked to rate “In general, how involved / engaged did you feel when you took part in this experiment?” on a 7-point scale (1 – Not at all; 7 – Very Much). One sample t-test was carried out considering 4.00 as the threshold for determining high (or low) level of involvement (see Appendix 10.2, p. 329). The results indicated that the intended level of involvement was achieved ($M = 6.25$; $t(283) = 40.92, p < .00$).

4.5 PRETESTING

For the reason that the experiment advertisements were created specifically for this experiment, there was a series of pretesting carried out to ensure that the intended levels of manipulations were met. Accordingly, an expert panel discussion was conducted first to evaluate a set of differently complex messages followed by pretesting II for selecting the most appropriate stimuli (both music and message) for the advertisement. A pilot test was then conducted to ensure that the entire experiment procedure was free from major technical shortcomings. A summary of each test is presented below and a full description of the respective pretest in Appendix 1 (p. 245).

4.5.1 Pretest I - Expert Panel Discussion (Appendix 1.1)

The main objective of the expert panel discussion was to obtain insights into enhancing the pre-developed messages to meet the desired levels of complexity. Fellow PhD students were recruited as the experts for this discussion. Accordingly, there were nine invitations sent and seven of them participated. The four main topic areas brought into the discussion were advertisement complexity in general, complexity of written messages, complexity of vocal messages, and the suggestions for improvement. The entire discussion lasted for one hour and 15 minutes and, with the prior permission of the participants, it was videotaped for subsequent analysis. Six messages developed initially were evaluated and discussed for further improvement.

The discussion on the complexity in ads in general revealed six aspects of a message that would affect its complexity: direct vs. indirect message, number of attributes communicated, level of organisation, generic vs. specific message, level of engagement, and familiarity with the contents. These patterns confirmed that the basis used to develop messages was valid to a great extent. Nonetheless, in order to be sure that the audio version of the same message would be perceived as having similar complexity as the written version, the audio version of the messages was also played and taken up for further discussion. Except for one message, the other manipulations appeared to be successful. Furthermore, the complexity level of the vocal messages also appeared to be perceived as being the same as that of the written message ($Z = -2.37, p < .05$). Accordingly, one message set reported to be ambiguous was eliminated and two message sets were used in the pretest II.

4.5.2 Pretest II – Online Test (Appendix 1.2)

The pretest II was conducted subsequent to the expert panel discussion for choosing the most appropriate message set (complex / simple). The second objective of this pretest was to evaluate the chosen music snippets for music-message congruence. However, the evaluation of musical stimuli was done by asking the participants to rate the appropriateness of each music snippet to a credit card commercial instead of playing such with the actual messages for the reason that the messages used for the experiment were also evaluated in the same test.

Twenty four (24) students from the College of Business and Law of the University of Canterbury participated in this test. The test was comprised of two sections: the first section consisted of two pairs (complex / simple) of messages and the second section had four music snippets that were presumed to be congruent and incongruent. Participants listened to each section separately and rated each stimulus on the respective characteristic (perceived complexity of message and perceived congruence of music).

Due to sample size limitations, Wilcoxon Signed Rank Tests were performed to determine the significant levels of mean differences. The results suggested that pair_2

containing msg3 and msg4 were better in terms of perceived complexity than pair_1. Similarly, the results pertaining to the perceived congruence suggested that mu1 and mu4 were more appropriate for congruent and incongruent music respectively. However, in order to overcome the above mentioned limitation, the selected stimuli from each factor were mixed together into four treatment advertisements and a manipulation check was conducted in a subsequent pilot study.

4.5.3 Pilot Study (Appendix 1.3)

The pilot study had three main objectives: a) to test the experiment procedure and detect any flaws in it; b) to determine the success of the manipulations; and c) to validate the accuracy of the computer programmes written to obtain the recognition memory score and working memory score by using the procedures explained previously in Sections 4.3.3.2 and 4.3.4.2 of this chapter.

A total of 24 participants were expected to participate in the pilot study based on the heuristics that suggested 12 participants per group for a pilot study of two or more groups would be adequate (Ailawadi et al., 2001; Engle et al., 1999). Accordingly, 37 undergraduates of the University of Canterbury participated in this phase.

The outcome of this study did not indicate any concerns regarding the execution of the experiment except for minor suggestions made to improve the understanding of some of the instructions. Furthermore, the participation through sending the email invitations in Stage II also appeared to be successful. The functionality of the computer programmes indicated no logic errors and therefore was considered to be reliable. Additionally, Manipulation checks were also conducted to determine whether the treatments were able to generate the intended levels of stimulation. Thus, two separate independent sample t-tests were carried out and the results indicated that mean differences for music ($t = -2.46$, $p = .02$) and complexity ($t = -6.89$, $p = .00$) manipulations were statistically significant. The summary of these results are shown in Table 4-12 and Table 4-13.

Table 4-12 - Descriptive Statistics for Music Congruence and Message Complexity Manipulations

Manipulation	Mean	Std Dev
<i>Music Congruence</i>		
Congruent	4.06	1.76
Incongruent	2.81	1.33
<i>Message Complexity</i>		
Complex	5.74	0.83
Simple	3.23	1.35

Table 4-13 - t-test Results for Manipulation Checks

Manipulation	t	sig
Music Congruence	-2.46	.02
Message Complexity	-6.89	.00

Since the pilot study did not indicate any major issues with the experiment procedure and its intended manipulations, the final data collection phase was conducted subsequently.

4.6 SAMPLE

The sample of this experiment was an online consumer panel registered with Amazon Mechanical Turk (www.mturk.com). One of the main reasons for using an online panel was to increase the external validity of the research. As mentioned in Section 4.2.1 of this chapter, external validity was a concern in a study that uses experiment methodology. Hence, in an attempt to reduce such limitations, a generic sample with a mixed set of participants was used.

4.6.1.1 Sample Size

It is considered that the minimum sample size for a between-subject experiment would be 30 subjects per group. However, given some provisions for (a) withdrawal of participants, (b) incomplete data sets, and (c) making the group sizes equal, 50 participants per group were considered prudent. However, considering the nature of this study, where participants were expected to return after approximately 48 hrs, a

significant margin was added to the sample size of a group. Hence, 100 participants per experimental condition were targeted for the main data collection phase. From there onwards, a total of 403 participants took part in the study.

4.6.1.2 Sampling Procedure

The sample was recruited by posting an invitation in Mechanical Turk. Initially, it was planned to adopt a ‘pulsing’ recruitment procedure where the recruitment invitation would be re-posted every two days. However, due to very high response rate for the first post, the expected number of responses was met without the need to re-post in subsequent times.

A part of the invitation contained a description of the study which included a general introduction to the study, what was expected of participants, special requirements of the study, details of the two stages, and the duration of each stage. However, as mentioned earlier, the actual objectives of this experiment were kept hidden and the prospective participants were told that it was to obtain feedback on a few advertisements. Furthermore, the payment for each stage and the eligibility requirement for especially Stage II were also mentioned. Finally, the link through which they were redirected to the experiment site developed in Qualtrics (www.qualtrics.com) was included.

Two separate payments were made for participation. The payment for Stage-I was \$0.50 and those who returned for Stage-II was paid an extra \$1.00. Such discrimination was made to encourage the return of the participants for Stage-II. Further, the participation in Stage-II was controlled by an access code given to them on successful completion of Stage-I. The same was also deployed in the email inviting the eligible participants for Stage-II. This code served two purposes. First, it prevented anyone attempting Stage-II without completing Stage-I and second, it was used to match the participants in both stages for the purpose of merging the data of Stage-II with those of Stage-I, as a repeated measure.

4.7 ETHICAL CONSIDERATION

This experiment was conducted in accordance with the ethical guidelines provided by the University of Canterbury Human Ethics Committee. Accordingly, the participants were clearly notified about their involvement in the experiment and its anonymity and confidentiality. Thus, the participants were informed that the study was confidential but was not anonymous due to the fact that Stage-II required contacting participants personally after approximately 48 hours. Thus, they were notified at the beginning about collecting their email addresses at the end of Stage-I for contacting them subsequently for Stage-II. To ensure confidentiality, the procedures recommended by the Ethics Committee were adhered to and the contact details of participants were not kept longer than necessary and were not used for any purpose other than what was specified in the research.

Participants were given the right to withdraw at any stage of the study without any penalty and this was notified to the participants at the first possible instance. Additionally, in line with the law that requires participants to be over 18 years old to take part in a study of this nature, a screening question was inserted at the beginning of the study that prevented underage participants from participating. Furthermore, the active consent of the participants was also obtained before the actual test began. To ensure active consent, participants had to click on "...I am willing to participate in this study" button to proceed.

In order to minimise contamination of the memory tests and the other cognitive measurements by participants' guessing the hypotheses, the actual objectives were kept hidden. Such deception was allowed, but the Human Ethics Committee made it a requirement that in such cases, the participants should be debriefed (see Appendix 7, p. 311) about the actual objectives at the earliest possible time. Hence, the debriefing was given to all the participants at the completion of Stage-II. This included an explanation for the deception, the stimulus manipulations in the target advertisements, different types of measurements obtained, and a statement enabling participants to withdraw their responses if they did not wish their data to be used in the analysis. Finally, all the collected data was stored in secured places with restricted access. They were encrypted and password protected in addition to being physically kept in a locked cabinet.

This research was reviewed and approved by the University of Canterbury Human Ethics Committee before collecting data. The approval letter is in Appendix 8 (p. 314).

4.8 EXPERIMENT PROCEDURE

As mentioned earlier, this experiment was composed of two stages. The main activities of Stage-I included exposing participants to the treatment advertisement, conducting immediate memory tests, measuring the affective response, determining the levels of psychological discomfort and cognitive load generated by the treatment advertisements, and gathering data on covariates. Stage-II of the experiment contained the delayed recall and recognition memory tests. The following section provides a detailed description of the experiment procedure in both these stages.

4.8.1 Sections of the Online Experiment

The experiment in this study was separated into 12 sections. The first section was placed in Mechanical Turk as the start page where an introduction to the entire study was provided. Stage-I contained seven sections while the remaining four sections were in Stage-II. All these sections were developed and deployed in Qualtrics (www.Qualtrics.com), which was an online survey technology provider. The participants were directed for Stage-I to the Qualtrics server from Mechanical Turk, and for Stage-II, through a personalised email sent to the address provided by each participant at the end of Stage-I.

4.8.2 Stage I

4.8.2.1 Section One – Appendix 4.1

The introductory page to the whole study, called ‘‘Hit Description,’’ was first displayed to the participants as an invitation to take part in the current study. This included an introduction to both stages of the research, the false objectives of the study, the involvement of the participants in both stages, and the reward for participation. Further, the special requirements of the study (sound device, headset, and non-disruptive environment) were also highlighted for the participants. Finally, they were requested to enter the unique user code generated by the experiment site at the end of Stage-I. The

main purpose of this screen was to introduce the participants to the study before they were redirected to the actual experimental site.

Finally, the link to the experiment site was shown and participants were advised to click on the link to visit it if they wished to accept the invitation. Immediately after this link was a box to enter the above mentioned user code. The participants were instructed to return to the same page after completion of Stage-I and enter the given code for rewarding purposes.

4.8.2.2 Section Two –Appendix 4.2

The second screen seen by the participant was the welcome page of Stage-I. It included a thank you note for accepting the invitation and the duration it would take to complete. Further, participants were reminded to enter the code that would be displayed at the end of this stage. Finally, special instructions were again highlighted in point form followed by the consent of the participants. They gave their consent by clicking on the button “YES, I am over 18 years old and I am willing to participate in this study.” If they did not intend to proceed, they could click the “NO, I don’t want to participate” option.

The participants were advised to revisit the link if they had clicked on the “NO” option accidentally; otherwise, they were thanked for considering participating in the study and the contact details were provided to contact the researcher in case they needed further clarifications about the study. The procedure was terminated at this stage and no unique number was displayed.

Those who had elected to proceed did a test audio for ensuring proper functionality of the audio plug-in and adjusting the volume to a comfortable level. The secondary objective of using a test audio clip was to orient the participants to the experiment environment so that the stimulus advertisement was not the first audio they were to listen to in the experiment.

4.8.2.3 Section Three – Appendix 4.3

The next section presented a fabricated statement about the three advertisements they were about to listen to. As mentioned earlier, the purpose of such manifestation was to increase the level of involvement with the experiment to a high level. This was followed by three advertisements, in which one was the manipulated advertisement (target) and the other two were lures. All three advertisements were played in a sequence with a gap of one second and fifty milliseconds.

Participants were randomly assigned to each experiment group in order to minimise the heterogeneity that may exist within groups. This was ensured by randomly exposing one of the four target advertisements to each participant. The experiment site was configured to do this randomisation and the advertisement that was exposed to the participant was recorded for identifying the response of that participant with the respective treatment group. In addition to using this information in the analysis, it was also used within the website to display the correct treatment advertisement for the second time.

4.8.2.4 Section Four – Appendix 4.4

Immediately after the exposure to the advertisements, the recall and recognition tests were conducted. The recall test contained three questions. The first one asked the participant to recall the categories of the product that was heard in the advertisements. The second question asked them to recall the brand while the last question asked the participant to type as many parts of the message as they could remember. All these questions were open-ended and the participants typed the answers relevant to all three advertisements as the target advertisement had not been revealed to them yet.

Next was the recognition memory test. As mentioned previously in Section 4.3.3.2, the test contained a list of 22 items and the participants were asked to mark whether they heard each item in any of the advertisement. All the items were displayed in a table and the options were displayed in front of each item. Since the ‘old-new’ technique was adopted, the respondents were prevented from proceeding without selecting an option for each item.

4.8.2.5 Section Five – Appendix 4.5

Section 5 presented the target advertisement once again in order to measure the psychological discomfort, cognitive load, and the attitude towards advertisement generated by the target advertisement. To achieve this, the site was programmed to read the information reordered previously about the treatment group that the participant belonged to and the correct target advertisement that was loaded into this section accordingly. However, for the purpose of disguising the target advertisement, they were told that *one* of the advertisements that they had previously listened to would be randomly presented once again and they were expected to answer some questions on what they felt about it. Consequently, the participants answered the questionnaire pertaining to the above mentioned constructs in that order.

4.8.2.6 Section Six – Appendix 4.6

In Section 6, the participants were presented with the NFC questionnaire. Although it was a covariate construct, it was presented in a separate section from the Working Memory test for the reason that the latter required a different form of involvement by the participant.

4.8.2.7 Section Seven – Appendix 4.7

The penultimate section of Stage-I was the Working Memory Test. Prior to the test, participants were given clear instructions on the tasks to be performed with an example. They were especially asked not to rehearse the words by any means.

As mentioned in Section 4.3.4.2, this test contained 30 neutral words in two of three, five, and seven word sets. Thus, a total of six word sets was randomly presented. Each word in a set was displayed on the screen and the screen automatically advanced every second to display the next word. At the end of a word set, text boxes equivalent to the number of words in the respective set was displayed and the participants were to type the words in the correct text boxes.

4.8.2.8 Section Eight – Appendix 4.8 and 4.9

Section 8 was the final section of Stage-I. It contained questions regarding the level of involvement with the experiment, music preference, radio listening hours, gender, and age. Finally, the participants were requested for their email address with a brief introduction to the next stage. A statement was also included to ensure confidentiality.

At the completion of the entire stage, a customised thank you note was displayed. This customised message included the unique confirmation-code generated by the website. The code was then saved with the response and displayed to the participant. They were also instructed to make a note of this code for future purposes.

4.8.3 Stage II

4.8.3.1 Section Nine – Appendix 4.10

An email invitation (Appendix 4.13, p. 303) was sent to all those who completed Stage-I after approximately 48 hours from the start of the experiment. This email contained a brief introduction to Stage-II, the unique confirmation code of the participant, and the link to the study site. This site too was separately developed and deployed in Qualtrics.

A welcome note was displayed on the introduction page of this stage including the time it would take for completion. Additionally, all the participants were required to enter the unique confirmation code sent to them via email. This code prevented anyone without completing Stage-I from attempting Stage-II, and redoing the same stage multiple times.

4.8.3.2 Section Ten – Appendix 4.11

Section 10 of the experiment contained recall and recognition memory tests. These tests were similar to what were conducted in Stage-I. However, as mentioned earlier in Section 4.3.3.3, the order of the items was changed to prevent it becoming a retrieval cue.

4.8.3.3 Section Eleven – Appendix 4.12

Finally, the participants were requested to enter the email address and the Mechanical Turk Worker Code for payment facilitation purposes. However, this information was removed from the database soon after rewarding the participants.

Once the participant clicked the ‘finish’ button, the thank you note was displayed followed by the complete debriefing of the experiment. Additionally, those who had completed Stage-II were sent a personalised email to thank them for their participation and to notify that the reward for their participation was made to Mechanical Turk.

4.9 CHAPTER SUMMARY

The objective of this chapter was to present the design of the experiment to test the hypothesised relationships presented in the Conceptual Model chapter. Accordingly, it began with an introduction to the methodological foundation of the research and followed by a description of the stimulus materials as well as the procedure for selecting them. Next, a discussion of the procedure used to measure the constructs identified in the model was presented. The pretests conducted in order to select the appropriate stimulus material were described briefly followed by the summary of the pilot study. The final section of the chapter explained the procedure adopted to conduct both stages of the experiment. The data analysis and the results of the study will be presented in the next chapter.

5 ANALYSIS AND RESULTS

5.1 INTRODUCTION

The purpose of this chapter is to present the results of statistical data analysis. It is structured under eight sections (Sections two to nine). Section two outlines the description of the sample and its composition, while Section three discusses the structure and the internal consistency of the scales used in this experiment. Sections four and five present the descriptive statistics and the manipulation checks of the main experiment respectively. The section that follows shows the results of the tests of 15 hypotheses in the conceptual model, and a summary of them is shown in Section seven. The next two sections (Sections 8 and 9) cover the path analysis carried out using Partial Least Squares -Structural Equation Modelling for testing the paths of the hypothesised model simultaneously.

5.2 SAMPLE SIZE AND COMPOSITION

The data collection process for this study started in August 2013 and was completed in November 2013. This period included conducting a pilot test and both stages of the experiment. Initially, a total of 402 subjects took part in Stage I of the main experiment and 337 of them turned up for the Stage II.

A pre-analysis was conducted to detect any missing values and outliers. As a result, 12 cases were detected and subsequently removed from the data set of Stage I. Similarly, out of 337 responses of Stage II, 53 cases had to be removed for similar reasons. Additionally, 17 more cases were randomly removed to make the group sizes equal to meet the assumptions of certain statistical models, such as Analysis of Covariance (ANCOVA). Consequently, 284 responses were considered for the final analysis of 71 responses in each treatment group.

5.2.1 Sample Composition

The sample is described under age, musical orientation, gender, musical preference, and the radio listening orientation. The results are summarised in Table 5-1.

The sample was comprised of 60.6% of males and 39.4% of females. The average age was distributed in such a way that 31 and 37.3% of participants belonged to the age group of 27-35 while 34.5% and 28.2% belonged to the age groups of 18-26 and above-35, respectively. The subjects were also asked to choose three preferable music genres out of 15 listed genres. Accordingly, the most preferred music genre of the sample was Rock music (59.9% of the sample mentioned they like Rock music) whereas Funk music was least preferred (2.5%). The genre categories, Funk and Soul, used in the congruent music in this study was liked by only 8.1% of the sample while Heavy Metal, the genre of incongruent music, was liked by 13.7%.

The radio listening habit of participants was also examined because radio advertisements were used in the present study context. Accordingly, poor radio listening habits were evident among the participants. The results indicated that the highest proportion (43.7%) of the sample listened to the radio only for 1 - 5 hours per week. The proportion of those who listened to it for less than an hour per week was 23.6% while only 3.9% reported that they listened to the radio more than 20 hours per week.

Table 5-1 - Proportion of the Sample for Demographic Variables

Variable	Description	Proportion
Gender	Male	60.6%
	Female	39.4%
	Didn't answer	0%
Age	18-26	34.5%
	27-35	37.3%
	Above 35	28.2%
Radio Listening Habit (in hours / week)	Less than 1	23.6%
	1-5	43.7%
	6-10	18.7%
	11-15	6.7%
	16-20	3.5%
	More than 20	3.9%
Music Preference ^a	Rock	59.9%
	Pop	40.1%
	Alternative	32.0%
	Classical	30.3%
	Hip-hop	28.9%
	Jazz	18.0%
	Country	14.1%
	Metal	13.7%
	Blues	13.7%
	Folk	12.7%
	Electronica	11.3%
	Religious	9.5%
	Other genres	7.7%
	Soul	5.6%
	Funk	2.5%

^a Each respondent was to select three from the list. Percentages will not add up to 100

5.3 SCALE STRUCTURE AND RELIABILITY

All the scales used in this study were assessed for internal consistency and for dimensionality. Accordingly, internal consistency among the items of each scale was tested using the Cronbach's alpha procedure (Cronbach, 1951), and to analyse the underlying dimensionality, the Principle Component Analysis was used. The procedure also determined which items to integrate into the corresponding composite measures of the respective scales.

5.3.1 Scale Structures

Scales structures were determined by employing Principal Component Analysis with Varimax rotation. A minimum loading criterion of 1 was adopted to recognise a factor, while 0.5 was considered the minimum loading criterion of the items on a given factor. Any item with a value greater than this load criterion for more than one factor in a scale was deemed to be cross-loaded. Furthermore, any communality value below 0.6 was considered inadequate. In order to confirm the adequacy of the sample size for factor analysis, Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy tests were also carried out. The KMO values with regards to each scale were well above the required threshold of 0.50 (Kaiser & Rice, 1974) indicating the adequacy of the sample size for the respective scale. A summary of the Principal Component Analysis after removing certain items from some scales is presented in Table 5-2 and each variable is described in the following sections.

Table 5-2 – Results of the Principal Component Analysis

Scale	Sampling Adequacy	Extracted Factor	
	KMO	Eigenvalue value	Variance Explained
<u><i>Independent Variables</i></u>			
Perceived Music Message Congruence	0.83	3.36	84.62
Perceived Message Complexity	0.79	2.26	75.36
<u><i>Dependent Variables</i></u>			
Psychological Discomfort	0.75	2.54	84.59
Cognitive Load	0.79	2.27	75.53
Attitude towards Advertisement	0.85	3.42	85.46
<u><i>Covariate</i></u>			
Need for Cognition	0.88	3.68	73.62

5.3.1.1 Independent Measures

The five items in Perceived Message Complexity were analysed, and as anticipated, the scale was unidimensional. However, two items (DF4 and DF5) were removed from the scale due to low communality scores. The total variance explained by this factor without the above two items was 75.4%. Similarly, four items used in the perceived Music Message Congruence scale were also unidimensional, explaining 84.6%

variance. The results did not show any prominent issues with communality values. Thus, all the items of this scale were retained for further analysis.

5.3.1.2 Process Variables

There were two variables considered under process variables -Psychological Discomfort and Cognitive Load. The Psychological Discomfort scale, consisting of three items, produced a single factor explaining a total variance of 84.6%. Similarly, Cognitive Load scale, consisting of five items, produced a single factor explaining 61.5% of total variance. However, two items (CL4 and CL5) were associated with low communality values and therefore deleted from the scale. The new three item scale explained 75.5% of the total variance.

5.3.1.3 Output Variables

Out of the five output variables mentioned in the conceptual model, only the Attitude towards Advertisement was measured through a semantic-differential scale. The other four memory-related variables were measured using special procedures explained in Section 4.3.3 of Chapter 4. Hence, only Attitude towards Advertisement was considered in this analysis and it produced a single factor explaining 85.5% of the total variance. There was no apparent issue associated with items in the scale and therefore all the items were retained.

5.3.1.4 Covariates

Out of the two covariates, only Need for Cognition was measured with a scale. A different method was employed to calculate the Working Memory Capacity, which is described in Section 4.3.4.2 of Chapter 4.

The modified scale used for measuring Need for Cognition consisted of five items. The initial analysis carried out on these items revealed that the scale was unidimensional with a factor explaining 73.6% of the total variance. As expected, no item appeared to be problematic and hence all items were retained in for further analysis.

5.3.2 Scale Reliability

Following the factor analysis, all the scales were analysed for their internal consistency with the use of Cronbach's alpha procedure. The summary of final reliability scores are listed in Table 5-3.

Table 5-3 - Reliability Scores of the Scales Used

Scale	Cronbach's Alpha
<i><u>Independent Variables</u></i>	
Perceived Music Congruence	0.96
Perceived Message Complexity	0.84
<i><u>Dependent Variables</u></i>	
Psychological Discomfort	0.91
Cognitive Load	0.84
Attitude Towards Advertisement	0.97
<i><u>Covariates</u></i>	
Need for Cognition	0.91

All the scales demonstrated an acceptable level of alpha values well above 0.70. However, certain items in some scales were deleted in the previous analysis for further improvement, except for the Perceived Music Message Congruence and Attitude scales. Despite the existing alpha values of these two scales being well within the acceptable range, the analysis indicated that the removal of FT4 from the Congruence scale and ATT2 from the Attitude scale would further increase reliability. Hence, the items were omitted from the respective scales for further analysis.

5.3.2.1 Inter-coding Reliability

Immediate and delayed recall measures were obtained through a set of open-ended questions. Since the responses were not listed for the participants to choose from, the score had to be obtained by marking the answers manually. Therefore, obtaining impartial as well as consistent results was important. In achieving this objective, the written answer-scripts were marked by two independent markers who were unaware of the actual research objectives, and the inter-coding consistency was checked with the correlation coefficients of marks in each category.

Table 5-4 - Inter-Coding Consistency of Recall Tests

Category or Recall	Correlation Coefficient	Sig
<i><u>Immediate</u></i>		
Category Recall	0.95	.00
Brand Recall	0.97	.00
Simple Message Recall	0.95	.00
Complex Message Recall	0.93	.00
<i><u>Delayed</u></i>		
Category Recall	0.98	.00
Brand Recall	0.99	.00
Simple Message Recall	0.95	.00
Complex Message Recall	0.99	.00

Accordingly, it appeared that there were very high correlations between the marks of two markers across all four categories (see Table 5-4). Therefore, the marks under each category were averaged into a single mark and used for further analysis.

5.4 DESCRIPTIVE STATISTICS

The Mean, Median, and Standard Deviation of each variable is presented in Table 5-5. Further, statistics for skewness and kurtosis are also presented to assume normality. Accordingly, the scales were approximately normally distributed with no strong evidence of skewness or kurtosis issues. The correlation matrix of all the measures is also presented in Table 5-6.

Table 5-5 - Descriptive Statistics of the Measures

Measurement	Mean	Median	Std. Dev.	Skewness	Kurtosis
<i><u>Manipulation Checks</u></i>					
Perceived Music Congruence	3.78	4.00	2.02	-0.23	-1.48
Perceived Message Complexity	3.99	4.00	1.55	0.03	-0.97
<i><u>Dependent Variables</u></i>					
Psychological Discomfort	3.11	2.67	1.59	0.59	-0.61
Cognitive Load	4.12	4.33	1.62	-0.16	-0.88
<i><u>Immediate Memory</u></i>					
Category Recall	0.45	0.25	0.36	0.73	-1.13
Brand Recall	0.49	0.75	0.48	-0.01	-1.94
Message Recall ^a	0.00	-0.18	1.00	0.99	0.75
Total Recall ^a	0.00	0.15	1.00	0.07	-1.02
Recognition Memory ^b	2.05	1.79	1.50	0.58	0.22
<i><u>Delayed Memory</u></i>					
Category Recall	0.52	0.25	0.37	0.36	-1.58
Brand Recall	0.59	1.00	0.48	-0.38	-1.83
Message Recall ^a	0.00	-0.08	1.00	0.79	-0.10
Total Recall ^a	0.00	0.09	1.00	-0.18	-0.79
Recognition Memory ^b	2.64	2.78	1.55	0.30	-0.43
Attitude towards Advertisement	4.26	4.33	1.87	-0.17	-1.13
<i><u>Covariates</u></i>					
Working Memory Capacity ^c	0.77	0.78	0.14	-0.91	2.18
Need for Cognition	4.95	5.20	1.47	-0.63	-0.38

a Standardised value**b** d' (d-prime) value**c** Partial-credit Unit Scoring

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Table 5-6 - Pearson Correlation Matrix for Measures in this Study

Measurement	CPLX	PDS	CLD	ICR	IBR	IMR	IRCL	IREC	DCR	DBR	DMR	DRCL	DREC	ATT	WMC	NFC
Perceived Message Complexity (CPLX)	-42*	.50*	.76*	-.13*	-.17*	-.15*	-.23*	-.25*	-.02	-.05	-.17*	-.10	-.17*	-.54*	.01	.23*
Perceived Music Congruence (CRCE)	1	-.60*	-.58*	.06	.23*	.28*	.24*	.03	-.02	.13*	.16*	.10	.06	.78*	-.02	-.06
Psychological Discomfort (PDS)		1	.65*	-.09	-.23*	-.32*	-.27*	-.18*	-.00	-.17*	-.29*	-.17*	-.15*	-.75*	-.02	.01
Cognitive Load (CLD)			1	-.08	-.17*	-.22*	-.20*	-.25*	.02	-.10	-.22*	-.11	-.15*	-.66*	-.07	.14*
Immediate Category Recall (ICR)				1	.10	.21*	.64*	.11	.53*	.02	.21*	.35*	.09	.10	.06	-.04
Immediate Brand Recall (IBR)					1	.33*	.81*	.27*	.03	.50*	.21*	.42*	.23*	.25*	.13*	-.04
Immediate Message Recall (IMR)						1	.53*	.25*	.06	.21*	.46*	.25*	.20*	.34*	.15*	.03
Immediate Total Recall (IRCL)							1	.30*	.32*	.40*	.34*	.52*	.25*	.29*	.15*	-.07
Immediate Recognition (IREC)								1	.04	.13*	.27*	.18*	.51*	.10	.16*	-.07
Delayed Category Recall (DCR)									1	.04	.17*	.61*	.15*	-.02	.07	.02
Delayed Brand Recall (DBR)										1	.33*	.80*	.19*	.17*	.06	.02
Delayed Message Recall (DMR)											1	.50*	.23*	.21*	.01	.14*
Delayed Total Recall (DRCL)												1	.27*	.14*	.08	.04
Delayed Recognition (DREC)													1	.07	.14*	.01
Attitude towards Advertisement (ATT)														1	.06	-.09
Working Memory Capacity (WMC)															1	.11
Need for Cognition (NFC)																1

* p<.05

5.5 MANIPULATION CHECKS

The two main manipulations done in this study were measured by the Perceived Music Congruence and Perceived Message Complexity. Both of these measures were self-reported by the subjects of the experiment.

The mean score and standard deviation score for the items in each scale are presented in Table 5-7 and Table 5-8. The cumulative figures and the overall reliability figures for each scale are also presented.

Table 5-7 - Perceived Music Congruence

Coding	Scale Item	Mean	Std. Dev.
FT1	The background music used in this ad was appropriate for the contents of the ad.	3.90	2.02
FT2	The music in the ad did NOT seem to fit with the message. (R)	3.77	2.15
FT3	The music in the ad did NOT match the product in the ad. (R)	3.66	2.11
Total Four Item Scale		3.78	2.02
Cronbach's α		0.96	

Table 5-8 - Perceived Message Complexity

Coding	Scales Item	Mean	Std Dev.
DF1	The content of this ad was complex.	3.82	1.82
DF2	I had to keep track of many things in my mind to understand the content of this ad.	4.49	1.76
DF3	The message of this ad was simple. (R)	3.65	1.77
Total Three Item Scale		3.99	1.55
Cronbach's α		0.84	

Separate independent sample t-tests were carried out to look for significant differences between the manipulated conditions. The results are exhibited in Table 5-9.

Accordingly, the mean differences of all the manipulation conditions showed a significant result, confirming that the intended manipulations were successful. Descriptive statistics for these manipulations are shown in Table 5-10.

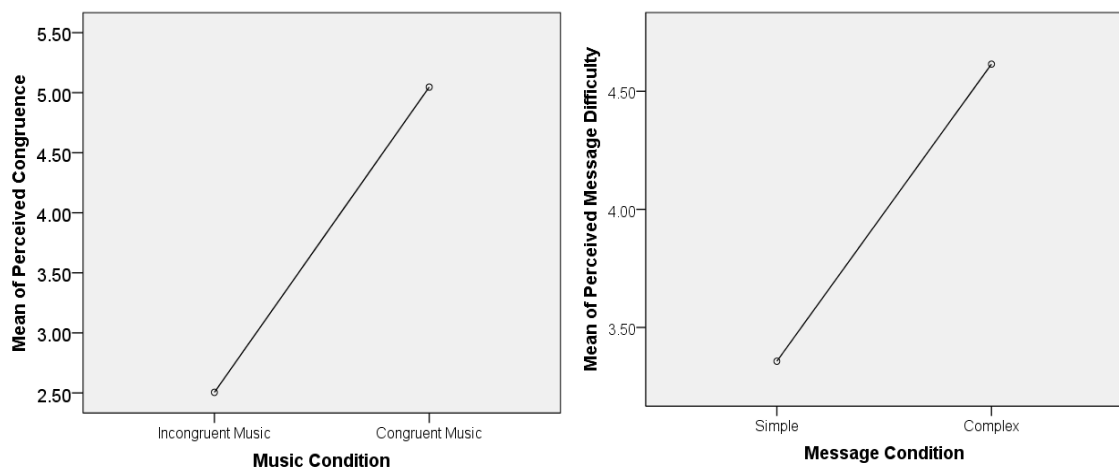
Table 5-9 - Results of Independent Sample t-test for Manipulations

Manipulation	t	Sig.
Music Condition	-13.64	.00
Message Condition	-7.48	.00

Table 5-10 - Descriptive Statistics for Manipulations

Manipulation	Mean	Std. Div.
<i>Level of Music Congruency</i>		
Congruent	5.05	1.39
Incongruent	2.50	1.73
Total	3.78	2.02
<i>Level of Message Complexity</i>		
Simple	3.36	1.34
Complex	4.61	1.49
Total	3.99	1.55

Though the effect was more prominent with the music condition than it was with the message condition, both manipulations were as expected. The perceived complexity score for the complex message ($M = 4.61$) was significantly higher than the same measure for the simple message ($M = 3.36$). Similarly, the perceived music congruence score for the congruent music ($M = 5.05$) was significantly higher than that of the incongruent condition ($M = 2.50$). These manipulation effects are depicted in Figure 5-1.

Figure 5-1 - Mean Profiles of Manipulations

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The effects of the socio-demographic variables were also examined with the manipulation condition. Thus, two separate ANCOVAs were carried out, having treated Age, Gender, Musical Orientation, and Radio Listening Hours as covariates with Perceived Music Congruence and Perceived Message Complexity as the dependent variable for each analysis. The results are shown in Table 5-12.

The results showed that Music Orientation of the subjects had a significant effect on both perceived measures while the influence of gender was significant only on perceived congruence. The effect of musical orientation on perceived music congruence was higher ($F = 14.00$; $p < .001$) than it was on perceived message complexity ($F = 4.79$; $p < .001$). Nonetheless, the partial Eta square (η_p^2) statistics indicated that the effect size was minimal in both situations ($\eta_p^2 = 0.04$ and $\eta_p^2 = 0.01$). Similarly, the effect size of gender on perceived congruence also remained minimal ($\eta_p^2 = .02$). None of the other demographic variables had a significant effect on manipulations.

Table 5-11 - Effects of Demographic Variables on Music Congruence

Variable	F	Sig.	η_p^2
Musical Orientation	13.00	.00	.04
Gender	5.84	.02	.02
Age	0.00	.98	.00
Radio Listening Hours	1.38	.24	.01
Perceived Music Congruence	204.00	.00	.42

Table 5-12 - Effects of Demographic Variables on Message Complexity

Variable	F	Sig.	η_p^2
Musical Orientation	4.69	.03	.02
Gender	0.55	.46	.00
Age	0.85	.36	.00
Radio Listening Hours	0.00	.98	.00
Perceived Message Complexity	52.79	.00	.16

5.6 HYPOTHESIS TESTING

Following the analysis of the sample composition and the overall effects of the manipulation, this section reports the entire procedure adopted for the analysis along with the results of hypotheses testing. There were 15 tested hypotheses in this study and different statistical models such as t-test, ANCOVA, MANCOVA, Hierarchical Regression, Repeated Measures MANCOVA, and Generalised Linear Model Binary Logistic were used depending on the characteristics of the data being tested.

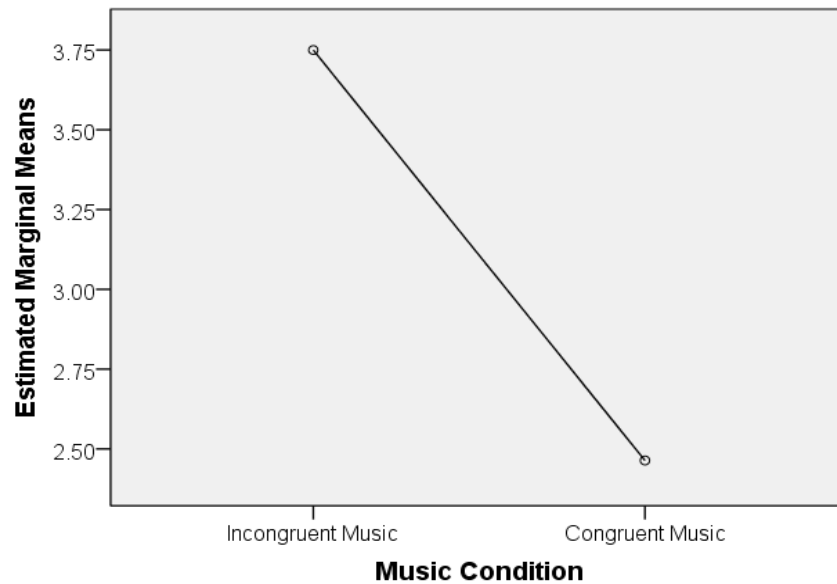
5.6.1 Effect of Music Congruence on Psychological Discomfort

Hypothesis 1 argued that Music Incongruence had the ability to increase Psychological Discomfort. To test this hypothesis, an Analysis of Covariance (ANCOVA) was undertaken. Consequently, a grouping variable for music congruence was entered as the fixed factor, followed by omit the two covariates (Need for Cognition and Working Memory Capacity). The perceived measure of Psychological Discomfort was entered as the model's dependent variable. The results of this analysis are shown in Table 5-13.

Table 5-13 – Effect of Musical Incongruence on Psychological Discomfort

	Psychological Discomfort			
	df	F	Sig.	η_p^2
<i>Factor</i>				
Music Congruence	1	54.84	.00	.16
<i>Covariates</i>				
Need for Cognition	1	0.68	.41	.00
Working Memory Capacity	1	2.93	.09	.01

The results indicated that Music Congruence significantly caused Psychological Discomfort ($F(1,280) = 54.84$; $p < .01$) and the effect size appeared to be moderate ($\eta_p^2 = .16$). Further, neither the Need for Cognition nor Working Memory Capacity indicated a significant effect on the dependent variable ($F(1,280) = 0.68, ns$; and $F(1,280) = 2.93, ns$ respectively) indicating an absence of any influence of those on Psychological Discomfort. Thus, Hypothesis 1 was supported. These results are also plotted in Figure 5-2.

Figure 5-2 - Mean Profile of Psychological Discomfort for Different Levels of Musical Congruence

Covariates appearing in the model are evaluated at the following values: WM Capacity = .77, NFC = 4.95

5.6.2 Effects of Message Complexity, Music Congruence, Psychological Discomfort on Cognitive Load

Chapter 04 argued that when perceived complexity of the message increased, it would consequently increase the level of Cognitive Load. In contrast, Hypothesis 2 predicted that congruent music would ease the Cognitive Load while incongruent music does the reverse. Additionally, it was also hypothesised that Psychological Discomfort positively affected Cognitive Load.

A ranking procedure was adopted to convert the values of Psychological Discomfort into a categorical variable to make it compatible with the ANCOVA model used in this analysis. Accordingly, the Psychological Discomfort grouping variable was computed based on the rank (1=Low and 2=High) assigned to each observed value. Next, descriptive statistics were obtained to check whether the ranks were closely distributed within the two groups (see Table 5-14). Further, an independent sample t-test was performed to determine whether the mean difference was significant. The results did not indicate any issues regarding the distribution, and the results of the t-test indicated the means were significantly different ($t(282) = -25.61, p < .01$). Hence, the new categorical variable was used as one of the fixed factors of the model.

Table 5-14 – Descriptive Statistics of the Psychological Discomfort Groups

	Cases	Mean	Median	Std.	Skewness	Kurtosis
Low	148	1.83	2.00	0.56	-0.22	-1.09
High	136	4.50	4.33	1.12	0.21	-0.60

In order to test the three hypotheses mentioned above, an ANCOVA was administered. Music Congruence, Message Complexity, and Psychological Discomfort were simultaneously entered into the model as fixed factors while Need for Cognition and Working Memory Capacity were entered as covariates. The result of the tested model is presented in Table 5-15 and Figure 5-3.

Table 5-15 – Results of the Determinants of Cognitive Load

	Cognitive Load Means ^a		Effects on Cognitive Load			
	Low	High	df	F	Sig.	η_p^2
<i><u>Factors</u></i>						
Music Congruence	4.57	3.71	1	30.49	.00	.10
Message Complexity	3.79	4.49	1	18.98	.00	.07
Psychological Discomfort	3.42	4.86	1	82.76	.00	.23
<i><u>Covariates</u></i>						
Need for Cognition			1	8.00	.01	.03
Working Memory Capacity			1	1.93	.17	.01

^a – Means for Cognitive Load in respective high/low factor conditions

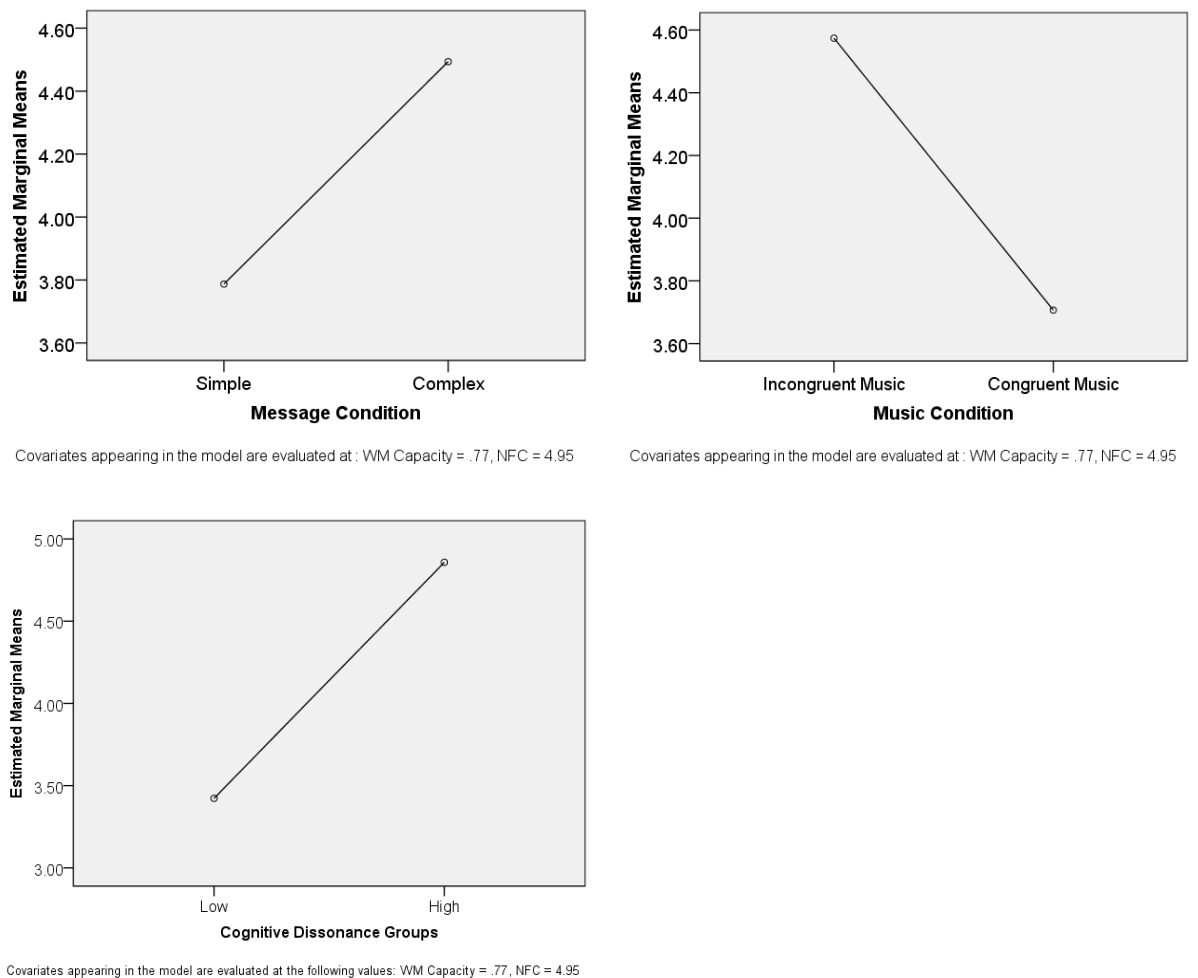
The results of the analysis indicated that all three factors affected Cognitive Load significantly. Of the three factors, Psychological Discomfort appeared to have the largest effect size, which is considerably larger than the other two. A larger significant mean value was associated with the complex message ($F(1,274) = 18.98, p < .01$) than that of the simple message indicating that the cognitive load was positively influenced by the level of complexity, supporting Hypothesis 2.

On the other hand, the negative significant mean difference ($\Delta M = -.87$; $F(1,274) = 14.97, p < .01$) associated with music congruence indicated that the higher level of Music Congruence attenuated perceived Cognitive Load. This result supported Hypothesis 3. Similarly, the significant mean difference in Psychological

Discomfort indicated that the Cognitive Load was positively influenced by it ($F(1, 274) = 82.76, p < .01$). Accordingly, Hypothesis 4 was also supported.

Out of the two covariate variables, only Need for Cognition appeared to have a significant effect on the dependent variable ($F(1, 274) = 8.00, p < .05$). Though the effect size remained relatively small ($\eta_p^2 = .03$), it showed the importance of considering it in the model.

Figure 5-3 – Mean Profiles of Cognitive Load for Message Complexity, Music Congruence, and Psychological Discomfort



5.6.3 Effect of Psychological Discomfort and Cognitive Load on Attitude

As mentioned in Chapter 03, experienced dissonance was considered as Psychological Discomfort. Hence, Hypothesis 5 argued that higher levels of Psychological Discomfort

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have a negative effect on the attitude towards the advertisement. Similarly, Hypothesis 6 argued that the same would be negatively affected by the cognitive load due to inferential error caused by inability to process.

All three variables involved in this analysis were numerical and therefore, hierarchical multiple regression analysis was conducted to test the hypothesis. Accordingly, the covariates were entered into Stage 1 of the model and Psychological Discomfort and Cognitive Load into Stage 2. For deriving the variances explained by individual variables separately, another hierarchical multiple regression was also conducted by entering the respective variables into a different model. The results are presented in Table 5-16 and Table 5-17.

According to the results (presented in Table 5-16), Psychological Discomfort caused a significant effect on the Attitude towards Advertisement ($\beta = -0.57$, $p < .01$). The negative β value confirmed the predicted direction of the relationship between the two variables. Thus, the Hypothesis 5 was supported. Further, the total variance of Attitude towards Advertisement explained by Psychological Discomfort alone was 18% (see Table 5-16).

The effect of Cognitive Load also had a significant negative effect as predicted ($\beta = -0.28$, $p < .01$), which was supportive of Hypothesis 6. As shown in Table 5-17, the total variance explained by adding this variable alone was 04%. Hence, the effect of Psychological Discomfort indicated a greater effect than that of Cognitive Load. The total variance explained in this full model was 61%.

Table 5-16 - Result for Hierarchical Multiple Regression Analysis of Attitude towards Advertisement

Attitudes towards the Ad		
	Standardised β	Sig.
<i>Model One (Covariates)</i>		
Need For Cognition	-0.10	.30
Working Memory Capacity	0.06	.10
ΔR^2	0.01	.18
<i>Model Two (Predictors)</i>		
Cognitive Load	-0.29	.00
Psychological Discomfort	-0.57	.00
ΔR^2	0.60	.00
<i>Overall R^2</i>	<i>0.61</i>	
<i>F</i>	<i>215.83</i>	<i>.00</i>
<i>df1</i>	<i>2</i>	

Table 5-17 - Effect Size of Individual Predictors on Attitude towards Advertisement

Attitude towards Ad		
	ΔR^2	Sig.
Cognitive Load	0.04	.00
Psychological Discomfort	0.18	.00

5.6.4 Cognitive Resource Utilisation

With the intention of testing the effect of different stimulus combinations on cognitive resource utilisation, the effect of each experiment condition on Cognitive Load was examined with Hypothesis 7.

To test this hypothesis, an ANCOVA was administered considering the grouping variable for all four experiment conditions. Instead of using the grouping variables representing each manipulation, this variable was used to examine resource pressure exerted by each experiment condition separately. Analogous to the previous analyses,

Need for Cognition and Working Memory Capacity were used as covariates. The results of this analysis are shown in Table 5-18 and Table 5-19.

Table 5-18 – Effects of Experiment Conditions on Cognitive Load

	Cognitive Load			
	df	F	Sig.	η_p^2
<i>Factor</i>				
Experiment Conditions	3	32.27	.00	.26
<i>Covariates</i>				
Need for Cognition	1	5.74	.02	.02
Working Memory Capacity	1	4.04	.04	.01

Table 5-19 – Combined Effects of Congruence and Complexity on Cognitive Load

Condition	Mean Difference					Sig. ^a Between Groups		
	Mean	Std. Err	CC	IS	IC	CC	IS	IC
Congruence-Simple (CS)	2.94	0.17	0.99	1.52	2.23	.00	.00	.00
Congruence – Complex (CC)	3.93	0.17		.52	1.24		.16	.00
Incongruent – Simple (IS)	4.45	0.17			0.71			.02
Incongruent – Complex (IC)	5.16	0.17						

a – Sidak adjustment for multiple comparisons was applied

As expected, the experiment conditions significantly caused Cognitive Load ($F(3, 278) = 32.27$, $p < .01$) with a relatively large effect size ($\eta_p^2 = .26$). Thus, a post-hoc analysis was carried out to test the statistical significance levels of the mean differences between these groups. Since there were more than two comparisons involved, the Type I error rate would be inflated (i.e. $(.95)^4 = 0.814$, which is 18.5 % of the Type I error rate). Therefore, the Sidak correction procedure (Šidák, 1967) on the confidence intervals was also administered to control such family-wise error rates.

Significant mean differences between the Congruent-Simple and Incongruent-Simple ($\Delta M_{CS-IS} = 1.52$, $p < .01$) as well as Congruent-Complex and Incongruent-Complex were found ($\Delta M_{CC-IC} = 1.24$, $p < .00$) except for Congruent – Complex and

Incongruent – Simple conditions ($\Delta M_{IS-CC} = -0.52, ns$). The means are plotted in Figure 5-4. This indicated that different combinations of the music and message would significantly determine the cognitive resource pressure. Thus, Hypotheses H7a, H7b, and H7c were supported.

Figure 5-4 - Mean Profile of Cognitive Load for Experiment Conditions



Covariates appearing in the model are evaluated at : NFC = 4.95, WM Capacity = .77

5.6.5 Effect of Cognitive Load on Memory

One of the dependent variables considered in this study was memory. However, as explained in Chapter 4, memory cannot be considered as a single measurable construct due to its many facets. Thus, memory in this study was measured with four separate measures under two main categories -Recall Memory and Recognition Memory.

In order to test the effects of memory based on three groups of Cognitive Loads (low, moderate, and high), the perceived measure of Cognitive Load had to be grouped. Thus, a ranking procedure was adopted, as before, and the mean rank was assigned for ties. Following this procedure, an ANOVA was carried out to determine the effects of such groups on the perceived measure of Cognitive Load. The mean differences were tested with the Tukey HSD post-hoc test. The results indicated that the differences were highly significant ($F(2,281) = 371.95, p < .01$) and the mean differences between

each group were also significant ($p < .01$). Descriptive statistics are reported in Table 5-20. Accordingly, the number of cases distributed among the groups was close and the mean value associated with each group was as expected.

Table 5-20 - Descriptive Statistics of Cognitive Load Groups

Group	Cases	Mean	Median	Std.	Skewness	Kurtosis
Low	97	2.26	2.33	.76	-.21	-.98
Moderate	86	4.18	4.33	.38	-.09	-1.41
High	101	5.83	5.67	.63	.28	-.95

5.6.5.1 Cognitive Load and Immediate Recall and Recognition Memory

Due to the correlation between recall and recognition memory, performing separate ANCOVAs for each variable would increase the Type I error (Field, 2009). Thus, Multivariate Analysis of Covariance (MANCOVA) was carried out to test Hypotheses 8a and 8b. These hypotheses argued that the relationship between Cognitive Load and Recall and Recognition were non-linear. In other words, when Cognitive Load increased from low level to moderate, it would positively affect recall memory, while this effect would be negative when Cognitive Load further increased from moderate to high.

Both Recall and Recognition memory variables were entered together into the model as dependent variables, while the grouping variable of Cognitive Load was used as the fixed factor. As usual, Need for Cognition and Working Memory Capacity were considered as the covariates in the model. For the same reasons mentioned earlier in Section 5.6.4 regarding the family-wise error rate, Sidak adjustments to the confidence interval were applied. Furthermore, a polynomial contrast procedure was also carried out to test the quadratic nature of the relationship.

The results of the multivariate analysis initially revealed an existence of significant differences between the dependent variables and Cognitive Load groups. This was reflected in a significant Wilks' Lambda score of the composite model ($\Lambda = .93, F(2, 279) = 5.50, p < .01$). Further, the same statistics were significant only for Working Memory Capacity ($\Lambda = .96, F(1, 279) = 5.48, p < .05$) but not for Need for

Cognition($\Lambda = .99, F(1,279) = 0.48, p = .62$). Next, the between-subject effects were investigated to find the effects of Cognitive Load on recall and recognition memory separately. The results are presented in Table 5-21 and Table 5-22.

Table 5-21 – Results of the Multivariate Analysis of Cognitive Load Effects on Immediate Memory

Variable	Wilks' Λ	F	Sig.	η_p^2
Cognitive Load	.92	5.50	.00	.04
Working Memory Capacity	.96	5.48	.00	.04
Need for Cognition	.99	0.48	.62	.00

Table 5-22 – Results of Between Subject Effects on Immediate Recall and Recognition Memory

	Immediate Recall Memory				Immediate Recognition Memory			
	df	F	Sig.	η_p^2	df	F	Sig.	η_p^2
<i>Factor</i>								
Cognitive Load	2	5.31	.00	.04	2	8.54	.00	.06
<i>Covariates</i>								
Need for Cognition	1	0.36	.55	.00	1	0.82	.37	.00
Working Memory Capacity	1	6.40	.01	.02	1	7.23	.01	.03

Accordingly, significant differences in both recall and recognition memory were found among the Cognitive Load groups ($F(2, 279) = 5.31, p < .01; \eta_p^2 = .04$ and $F(2, 279) = 7.89, p < .01; \eta_p^2 = .06$ respectively). Though both effect sizes remained relatively low, recognition memory seemed to have a larger effect size than recall memory. Further, a pair-wise comparison was conducted between each dependent variable and the Cognitive Load groups (see Table 5-23). The result revealed that there was a significant difference in recall memory between low and high Cognitive Load groups ($p < .01$), but the mean difference between the moderate and the two other groups (i.e. low and high) appeared to be insignificant. A similar pattern was found in recognition memory as well. In other words, recognition memory was significantly different only between low and high levels of the Cognitive Load ($p < .01$), but not between low and moderate levels. However, the mean difference in

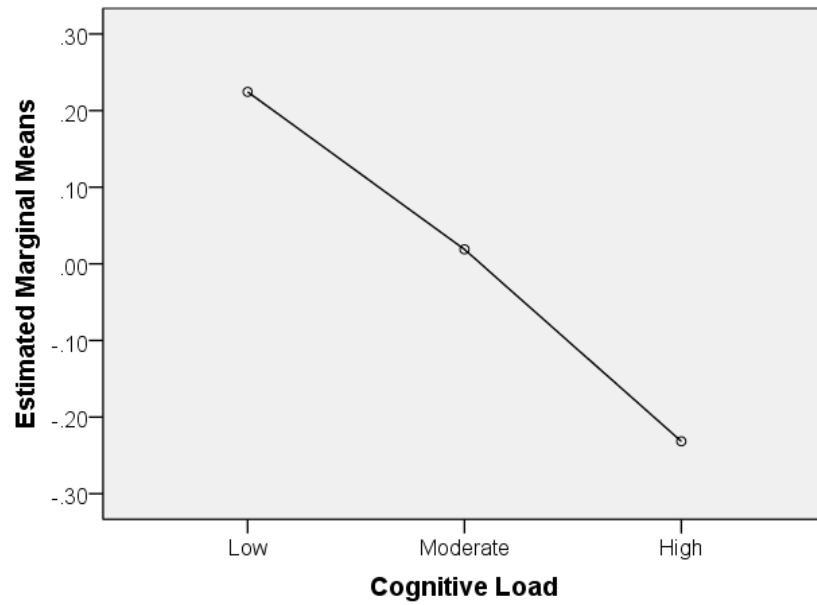
recognition memory between moderate and high level of Cognitive Load was marginally significant ($p < .10$).

Table 5-23 – Pair-wise Comparison Matrix of Cognitive Load Groups on Immediate Memory

Cognitive Load Groups	Moderate		High	
	ΔM	Sig.	ΔM	Sig.
<u>Immediate Recall</u>				
Low	.21	.40	.46	.00
Moderate			.25	.14
<u>Immediate Recognition</u>				
Low	.38	.22	.86	.00
Moderate			.48	.07

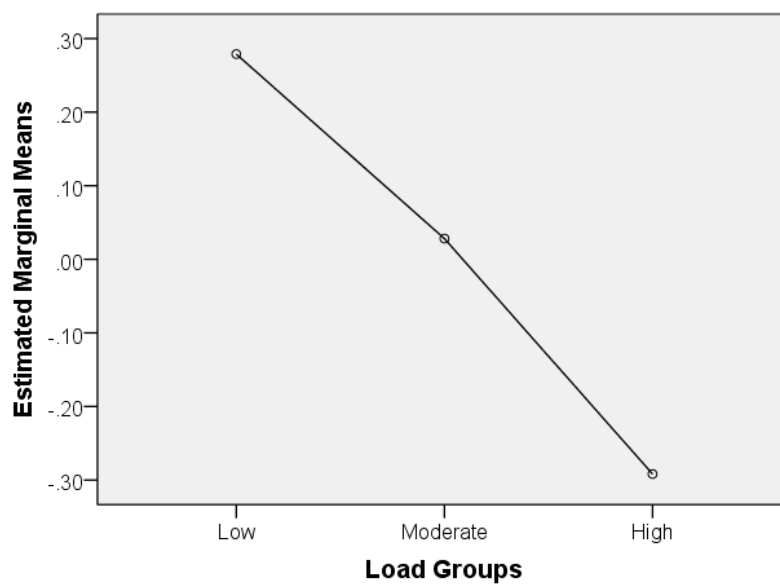
Contrary to the predicted inverted “U” relationship, the mean statistics together with the polynomial analysis revealed that the relationships between Cognitive Load and both recall ($p_{Linear} < .01$; $p_{Quadratic} > .05$) and recognition memory ($p_{Linear} < .01$; $p_{Quadratic} > .05$) were linear. Therefore, Hypotheses 8a and 8b were not fully supported. The means of both recall and recognition memory in respective load groups are plotted in Figure 5-5 and Figure 5-6.

Figure 5-5 - Mean Profile of Immediate Recall Memory for Cognitive Load



Covariates appearing in the model are evaluated at : WM Capacity = .77 , NFC = 4.94

Figure 5-6 - Mean Profile of Immediate Recognition Memory for Cognitive Load



Covariates appearing in the model are evaluated at : WM Capacity = .77 , NFC = 4.94

5.6.6 Delayed Memory Effects

As mentioned in Chapter 04, participants were tested for recall and recognition memory after a delay ($M = 55.03$ hrs, $S = 7.94$) in order to measure the ability to retain the memory encoded and stored in Stage I of the experiment. Consistent with the RM Hypothesis (see Section 3.3.5.2), Hypotheses 9a and 9b predicted that memory encoded at a moderate level of Cognitive Load is retained better than under the other two conditions.

Accordingly, two analyses were undertaken: a) Delayed recall and recognition memory behaviour in relation to the different levels of Cognitive Load; b) within-subject difference between the respective immediate and delayed memory measures. Thus, MANCOVA and repeated-measures MANCOVA were administered accordingly. Again, to minimise the family-wise error, the Sidak adjustment procedure was adopted. The following section provides the results of each of these analyses.

5.6.6.1 Effect of Cognitive Load on Delayed Recall and Recognition Memory

Observed values of the Delayed Recall and Delayed Recognition memory were considered as the dependent variables of MANCOVA, while Cognitive Load was considered as the fixed factor. As before, both Need for Cognition and Working Memory Capacity were entered as covariates of the model.

Table 5-24 – Results of the Multivariate Analysis of Cognitive Load Effects on Delayed Memory

Variable	Wilks' Λ	F	Sig.	η_p^2
Cognitive Load	.95	3.60	.01	.03
Need for Cognition	.99	0.33	.72	.00
Working Memory Capacity	.97	4.41	.01	.03

Table 5-25 - Results of Between Subject Effects on Delayed Recall and Recognition Memory

	Delayed Recall Memory				Delayed Recognition Memory			
	df	F	Sig.	η_p^2	df	F	Sig.	η_p^2
<u>Factor</u>								
Cognitive Load	2	5.49	.00	.04	2	2.94	.05	.02
<u>Covariates</u>								
Need for Cognition	1	0.48	.49	.00	1	0.07	.78	.00
Working Memory Capacity	1	5.91	.01	.02	1	4.55	.03	.02

According to the results of the multivariate analysis presented in Table 5-24, the existence of a significant mean difference between Cognitive Load groups ($\Lambda = .95$, $F(2, 279) = 3.60$, $p < .05$) was revealed, considering both delayed recall and recognition memory together. Similar to the results of the previous analysis, only Working Memory Capacity appeared to have a significant impact as a covariate ($\Lambda = .97$, $F(1, 279) = 4.41$, $p < .05$).

The between-subject analysis (see Table 5-25) revealed an existence of a significant effect of Cognitive Load on Delayed Recall Memory ($F(2, 279) = 5.49$, $p < .01$). However, the effect size appeared to be small ($\eta_p^2 = .04$). Surprisingly, the mean differences of Delayed Recognition memory between the groups of Cognitive Load were only marginally significant ($F(2, 279) = 2.94$, $p < .10$) and the effect size also appeared to be small ($\eta_p^2 = .02$).

As in the case of Hypothesis 8, Hypothesis 9 also predicted a non-linear relationship between Cognitive Load and the delayed memory constructs. Therefore, the means of the dependent variables were plotted against the respective levels of the independent variable as shown in Figure 5-7 and Figure 5-8. Accordingly, the relationship appeared to be negatively linear. This was further confirmed by the contrast analysis on Recall Memory ($p_{Linear} < .01$; $p_{Quadratic} > .05$) and Recognition Memory ($p_{Linear} < .05$; $p_{Quadratic} > .05$).

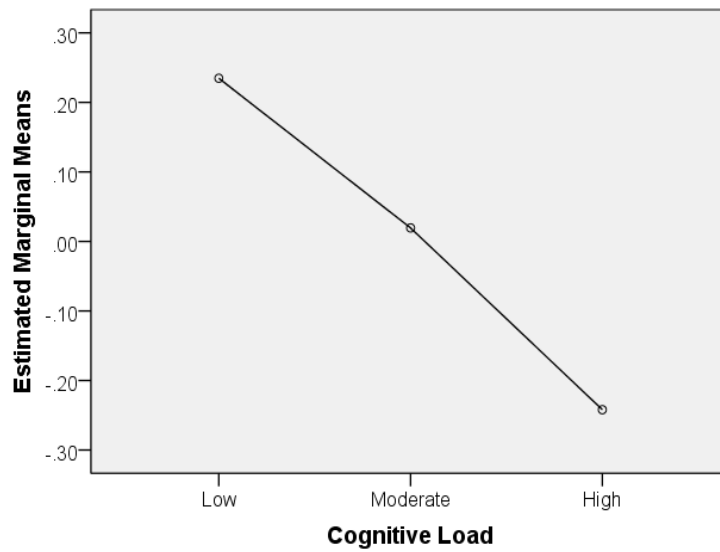
Table 5-26 – Pair-wise Comparison Matrix of Cognitive Load Groups on Delayed Memory

Cognitive Load Groups	Moderate		High	
	ΔM	Sig.	ΔM	Sig.
<u>Delayed Recall</u>				
Low	-0.22	.36	-0.48	.00
Moderate			-0.26	.20
<u>Delayed Recognition</u>				
Low	-0.17	.55	-0.35	.04
Moderate			-0.18	.55

The mean differences between the Cognitive Load groups were consistent with those of the Immediate Recall memory. In other words, a significant mean difference in Delayed Recall Memory was found only between low and high levels of Cognitive Load ($\Delta M_{Low \rightarrow High} = -0.48, p < .01$), but the mean differences between the moderate level and respective low and high levels of Cognitive Load were not significant ($\Delta M_{Low \rightarrow Mod} = -0.22, ns$; $\Delta M_{Mod \rightarrow High} = -0.26, ns$). A similar effect was found with Delayed Recognition Memory as well. Despite finding a marginally significant value in between-subject analysis (see Table 5-25), the pair-wise comparison indicated a significant mean difference for Delayed Recognition Memory between low and high levels of Cognitive Load ($\Delta M_{Low \rightarrow High} = -0.35, p < .05$). However, the remaining group differences were not significant (see Table 5-26).

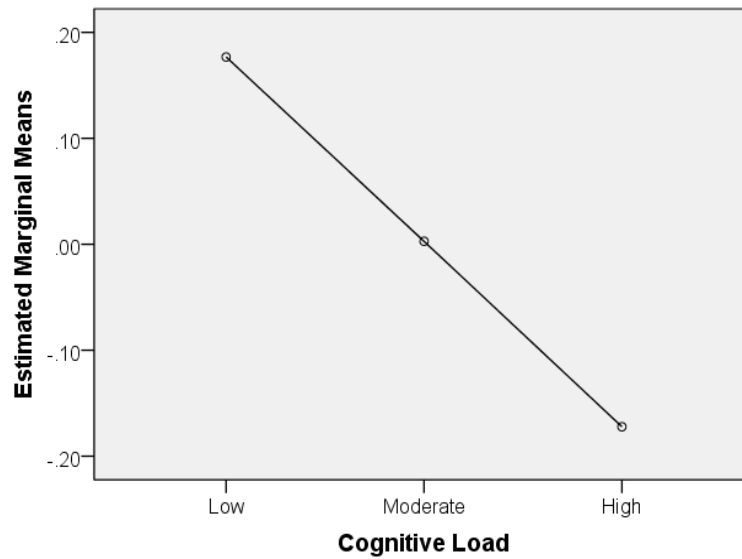
The result of this analysis did not provide support for Hypotheses 9a and 9b. Instead of moderate Cognitive Load being associated with the highest mean value, the low and high levels of cognitive load conditions were associated with the highest and lowest delayed memory respectively.

Figure 5-7 - Mean Profile of Delayed Recall Memory for Cognitive Load



Covariates appearing in the model are evaluated at: WM Capacity = .77, NFC = 4.95

Figure 5-8 - Mean Profile of Delayed Recognition Memory for Cognitive Load



Covariates appearing in the model are evaluated: WM Capacity = .77, NFC = 4.95

5.6.6.2 Effect of Cognitive Load on Repeated Measures

The final set of hypotheses tested in this study pertained to the repeated measure, or the difference between the immediate memory and the delayed memory. Hypotheses 9c and 9d predicted that the difference between the recall and recognition memory would be significant at low and high levels of Cognitive Load, but not at the moderate level.

These hypotheses were tested using repeated measures MANCOVA. Accordingly, a within-subject variable was created (Time) with two levels and two measurement variables, Recall and Recognition memory. Immediate Recall, Delayed Recall, Immediate Recognition and Delayed Recognition were assigned to each level of the within-subject variables (i.e., immediate and delayed). As in the other analyses, the Cognitive Load grouping variable was used as the fixed factor and Need for Cognition and Working Memory Capacity were considered as the covariates.

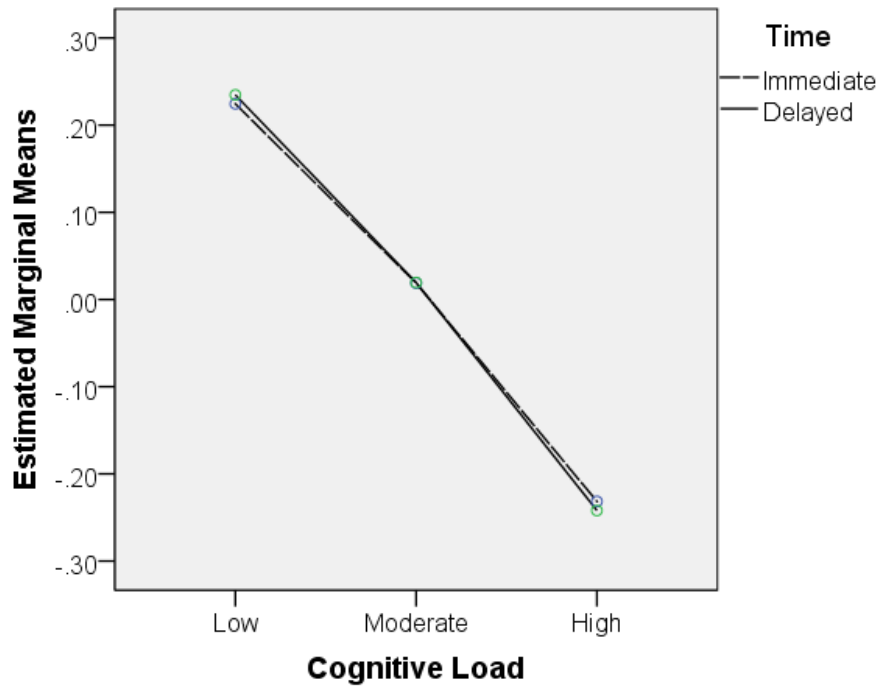
Table 5-27 – Results of the Multivariate Analysis of Cognitive Load Effects on Repeated Memory Measures

Within Subject Effect	Wilks' Λ	F	Sig.	η_p^2
<u>Within-Factor</u>				
Time	.98	1.98	.14	.01
<u>Between-Subject Factor - Interaction</u>				
Time * Cognitive Load	.96	3.78	.00	.03

Table 5-28 – Results of Within-Subjects Contrasts: Immediate vs. Delayed

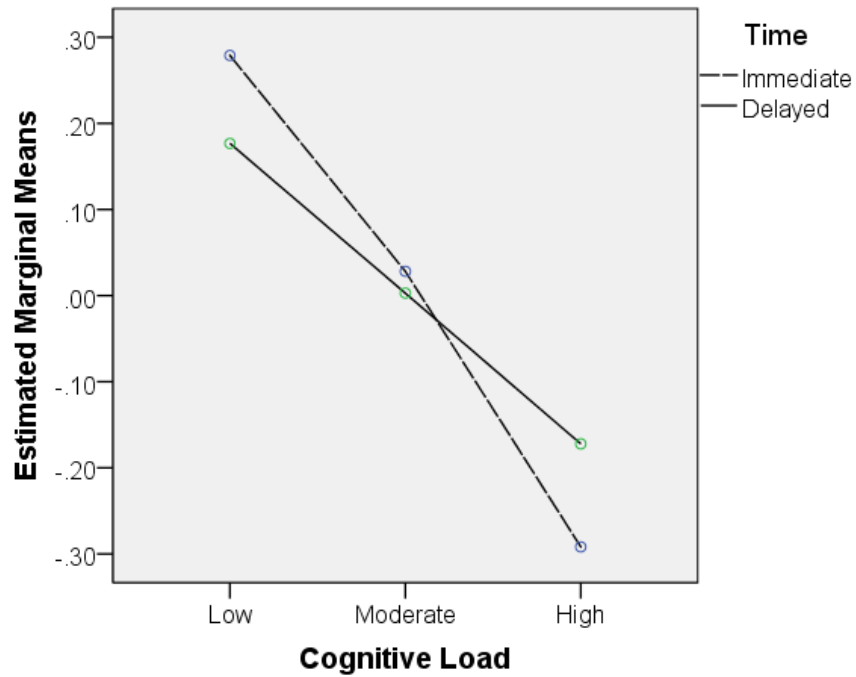
	df	F	Sig.	η_p^2
<u>Time</u>				
Recall	1	3.95	.04	.01
Recognition	1	.04	.85	.00
<u>Time * Cognitive Load</u>				
Recall	2	6.61	.00	.05
Recognition	2	1.24	.29	.01

Figure 5-9 – Means Profile of Repeated Recall Memory for Cognitive Load



Covariates appearing in the model are evaluated at: NFC = 4.95, WM Capacity = .77

Figure 5-10 - Means Profile of Repeated Recognition Memory for Cognitive Load



Covariates appearing in the model are evaluated: NFC = 4.95, WM Capacity = .77

According to the results presented in Table 5-27, time did not have any direct effect on the repeated measure. In other words, irrespective of Cognitive Load, memory did not seem to differ across time ($\Lambda = .98$, $F(2, 278) = 1.98$, $p = .14$). However, the data indicated a significant interaction effect between Cognitive Load and time ($\Lambda = .96$, $F(4, 558) = 3.74$, $p < .01$, $\eta_p^2 = .03$). This suggested the existence of a significant mean difference between Cognitive Load groups in either [both] recall or [and] recognition memory (see Table 5-28). Thus, a respective Univariate test examined this interaction. Accordingly, it was found that differences across Cognitive Load existed only for Recall ($F(2, 279) = 6.61$, $p < .01$, $\eta_p^2 = .05$) but not for Recognition memory ($F(2, 279) = 1.24$, ns). However, the difference was only significant when taking the Cognitive Load into consideration ($\Delta M = 0.00$, $p = .95$). Pairwise comparison of Cognitive Load * Time interaction indicated that the mean differences were significant only in the Low and High groups ($\Delta M_{Low} = -0.011$, $p = .02$; $\Delta M_{High} = 0.012$, $p < .01$). No significant difference was found ($\Delta M = -0.001$, $p = .73$) between the temporal measures in the moderate level of Cognitive Load (see Table 5-29). The mean difference indicated a negative difference, the reasons for which will be further discussed in Chapter 6.

Table 5-29 – Pair-wise Comparisons for Within-subject Recall and Recognition Memory

Cognitive Load Group	<u>Recall</u>		<u>Recognition</u>	
	Mean Dif.	Sig.^a	Mean Dif.	Sig.^a
	(I-D)		(I-D)	
Low	-.011	.02	.112	.30
Moderate	-.001	.73	.034	.76
High	.012	.00	-.137	.11

a – Sidak adjustment for multiple comparisons was applied

The within-subject analysis indicated a significant difference between the immediate and delayed memory of low and high groups of Cognitive Load while there was no significant difference in moderate Cognitive Load. However, a similar pattern did not appear in Recognition memory. Hence, Hypothesis 9c was partially supported while Hypothesis 9d was not.

5.7 SUMMARY OF HYPOTHESIS TESTING

A summary of the hypotheses testing is given in Table 5-30.

Table 5-30 - Summary of Hypotheses Tests Results

Hypothesis	Supported
H1 Incongruent music in an advertisement will generate incongruent cognitions, thereby increasing the felt Psychological Discomfort.	✓
H2 A complex message results in a higher level of perceived Cognitive Load than does a simple message in an externally-paced media.	✓
H3 Congruent music will have Gestalt effects on message processing and hence will attenuate the felt Cognitive Load.	✓
H4 The higher the Psychological Discomfort, the greater the demands for cognitive resources, which will thereby increase the felt Cognitive Load.	✓
H5 Increased levels of dissonance experienced as psychological discomfort lead to negative valance of attitude towards advertisement.	✓
H6 When the perceived cognitive load increases, it will lead to negative valance of attitude towards the advertisement.	✓
H7 The effect on Cognitive Load is such that;	
a: SC has a lower effect on Cognitive Load than that of SI.	✓
b: SI and CC have similar effects on Cognitive Load.	✓
c: CI has a higher effect on Cognitive Load than that of CC.	✓
H8 The relationship between Cognitive Load and ...	
a: Immediate Recall memory will mimic an inverted “U” shape.	×
b: Immediate Recognition memory will mimic an inverted “U” shape.	×
H9 The relationship between Cognitive Load and ...	
a: Delayed Recall Memory will mimic an inverted “U” shape.	×
b: Delayed Recognition Memory will mimic an inverted “U” shape.	×
c: The difference between immediate and delayed recall memory will be significant at low and high levels of cognitive load, but not at the moderate level.	✓ _P
d: The difference between immediate and delayed recognition memory will be significant at low and high levels of cognitive load, but not at the moderate level.	×

5.8 ANALYSES OF RECALL COMPONENTS

As mentioned before, Immediate and Delayed Recall Memory consisted of Category, Brand, and Message. Nonetheless, such a measure did not explain the individual behaviour of the respective recall components. Though the behaviour of these individual components was not hypothesised in the conceptual model, the next section presents an analysis of these separate components.

5.8.1 Category Recall and Brand Recall

The marking scheme adopted to derive the category and brand recall scores enabled respective scores to take values other than 1 (correctly recall) and 0 (not correctly recall). In other words, it was possible to get fractions as marks according to the existing marking scheme (see Appendix 5, p. 304). This scheme was adopted to allow markers to mark the scripts in a more realistic manner and also to use it in calculating the total recall scores with greater accuracy. However, in this case, the distribution of data would be more representative of a binary distribution than a Gaussian distribution. Hence, values were recoded so that a score > 0.50 was deemed to be 1 and any other value to be 0. With this conversion, the effects of different groups of Cognitive Load and Attitude towards Advertisement were examined.

To analyse the effects, *Generalised* Linear Model was adopted and *binomial* probability distribution with *logit* link function were used (Binary Logistic). Further, Need for Cognition and Working Memory Capacity was considered as the covariates. The same model was adopted to test the Cognitive Load effect on Immediate Category Recall, Immediate Brand Recall, Delayed Category Recall, and Delayed Brand Recall. Since multiple comparisons were involved, the Sidak adjustment on p value was also applied to reduce the Type I error. The following section presents the results of each case of recall.

5.8.1.1 Cognitive Load on Immediate Category Recall

The analysis revealed that the different levels of Cognitive Load did not have a significant effect on recalling the category of the target advertisement ($\chi^2(2) = 3.15$, *ns*) (see Table 5-31) and the pair-wise comparison between the groups of Cognitive Load also confirmed the above finding (see Table 5-33). Furthermore, Working Memory Capacity ($\chi^2(1) = .38$, $p = .53$) and Need for Cognition ($\chi^2(1) = 0.86$, $p = .35$) did not influence the output significantly. Though the estimated mean values shown in Table 5-32 provided an indication of an inverted “U” relationship, the mean differences between Cognitive Load and Immediate Category Recall were not significant.

Table 5-31 - Effects of Model Variables with Cognitive Load on Immediate Category Recall

	Wald Chi-Square	df	Sig.
Cognitive Load	3.15	2	.20
Working Memory Capacity	.38	1	.53
Need For Cognition	.86	1	.35

Table 5-32 - Estimated Means for Immediate Category Recall

Cognitive Load	Estimated Mean	Std. Error
Low	.33	.048
Moderate	.36	.052
High	.24	.043

Table 5-33 - Pairwise Comparison of Cognitive Load on Immediate Category Recall

Cognitive Load (I)	Cognitive Load (J)	Mean Difference (I-J)	df	Sig. ^a
Low	Moderate	-.02	1	.98
	High	.09	1	.40
Moderate	Low	.02	1	.98
	High	.07	1	.25

a – Sidak adjustment for multiple comparisons was applied

5.8.1.2 Cognitive Load on Immediate Brand Recall

The analysis provided evidence of the existence of a significant effect of Cognitive Load on Immediate Brand Recall ($\chi^2(2) = 7.44, p = .02$). Nonetheless, a significant mean difference was observed only when Cognitive Load increased from low level to high level ($p = .01$) and did not seem to have a significant effect between moderate and low as well as moderate and high levels. Further, the estimated mean values (see Table 5-35) and the model's beta ($\beta = -.81$) value indicated a significant drop in the recall value between low and high levels of Cognitive Load. In other words, Immediate Brand Recall was negatively influenced by Cognitive Load.

Not only the predictor but also the covariates had a significant influence on brand recall. Accordingly, Working Memory Capacity had a significant effect over other two variables ($\chi^2(1) = 4.33, p = .03$) and based on the unstandardised β value, the ability to recall the brand name ($\beta = 1.91$) was positively influenced. However, the effect of Need for Cognition appeared to be not significant ($\chi^2(1) = 1.06, p = .30$). These results are shown in Table 5-34 and Table 5-36.

Table 5-34 - Effects of Model Variables with Cognitive Load on Immediate Brand Recall

	Wald Chi-Square	df	Sig.
Cognitive Load	7.44	2	.02
Need For Cognition	1.06	1	.30
Working Memory Capacity	4.33	1	.03

Table 5-35 – Estimated Means for Immediate Brand Recall

Cognitive Load	Estimated Mean	Std. Error
Low	.62	.050
Moderate	.51	.055
High	.42	.050

Table 5-36 - Pairwise Comparison of Cognitive Load on Immediate Brand Recall

Cognitive Load (I)	Cognitive Load (J)	Mean Difference (I-J)	df	Sig. ^a
Low	Moderate	0.11	1	.33
	High	0.20	1	.01
Moderate	Low	-0.11	1	.33
	High	0.09	1	.58

a – Sidak adjustment for multiple comparisons was applied

5.8.1.3 Cognitive Load on Delayed Category Recall

Like Immediate Category Recall, Delayed Category Recall also did not show significant mean differences among the Cognitive Load groups ($\chi^2(2) = 0.86, p = .13$). However, Working Memory Capacity appeared to have a marginally significant influence on the dependent measurement ($\chi^2(1) = 2.65, p = .10$), while the effect of Need for Cognition remained insignificant ($\chi^2(1) = 0.64, p = .42$). The results are displayed in Table 5-37, Table 5-38 and Table 5-39.

Table 5-37 - Effects of Model Variables with Cognitive Load on Delayed Category Recall

	Wald Chi- Square	df	Sig.
Cognitive Load	0.86	2	.13
Working Memory Capacity	2.65	1	.10
Need For Cognition	0.64	1	.42

Table 5-38 – Estimated Means of Delayed Category Recall

Cognitive Load	Estimated Mean	Std. Error
Low	.37	.050
Moderate	.43	.054
High	.43	.050

Table 5-39 – Pair-wise Comparison of Cognitive Load on Delayed Category Recall

Cognitive Load (I)	Cognitive Load (J)	Mean Difference (I-J)	df	Sig. ^a
Low	Moderate	-.06	1	.83
	High	-.06	1	.78
Moderate	Low	.06	1	.83
	High	.00	1	1.00

a – Sidak adjustment for multiple comparisons was applied

5.8.1.4 Cognitive Load on Delayed Brand Recall

The mean differences listed in Table 5-42 indicate that the Delayed Brand Recall too follows a negative linear trend, which is similar to what was found in Immediate Brand Recall (also see Table 5-41). Deviating from Immediate Brand Recall, no significant mean differences were found among the Cognitive Load groups ($\chi^2(2) = 2.85, p = .24$). Additionally, none of the covariates reported a significant influence on the dependent variable (see Table 5-40).

Table 5-40 - Effects of Model Variables with Cognitive Load on Delayed Brand Recall

	Wald Chi- Square	df	Sig.
Cognitive Load	2.85	2	.24
Working Memory Capacity	0.86	1	.35
Need For Cognition	0.07	1	.78

Table 5-41 – Estimated Means of Delayed Brand Recall

Cognitive Load	Estimated Mean	Std. Error
Low	.67	.048
Moderate	.58	.053
High	.55	.050

Table 5-42 – Pair-wise Comparison of Cognitive Load on Delayed Brand Recall

Cognitive Load (I)	Cognitive Load (J)	Mean Difference (I-J)	df	Sig.^a
Low	Moderate	.09	1	.55
	High	.12	1	.26
Moderate	Low	-.09	1	.55
	High	.03	1	.97

a – Sidak adjustment for multiple comparisons was applied

5.8.2 Message Recall

Unlike the other two components, Message Recall took a range of values from 0 to 1 based on the marks assigned to correctly recalled message parts. Therefore, to test the effect of Cognitive Load on both Immediate Message Recall and Delayed Message Recall, two separate ANCOVAs were administered. Accordingly, two respective memory measures were regarded as the dependent variables while Cognitive Load was entered as the fixed factor. The two covariate variables (Need for Cognition and Working Memory Capacity) were also entered in each model. The following section presents the findings.

5.8.2.1 Cognitive Load Effects on Immediate Message Recall

Initial ANCOVA indicated (see Table 5-43) that Cognitive Load had a highly significant effect on Immediate Message Recall ($F(2, 279) = 9.56, p < .01$). Furthermore, the effect of Working Memory Capacity also significantly influenced the dependent variable ($F(1, 279) = 4.42, p < .01$). The pair-wise comparison carried out subsequently (see Table 5-44) revealed that the differences were significant between the Low and Moderate ($p < .01$), and Low and High levels of Cognitive Load ($p < .05$), but not between the Moderate and High levels ($p > .05$). The mean profile is shown in Figure 5-11.

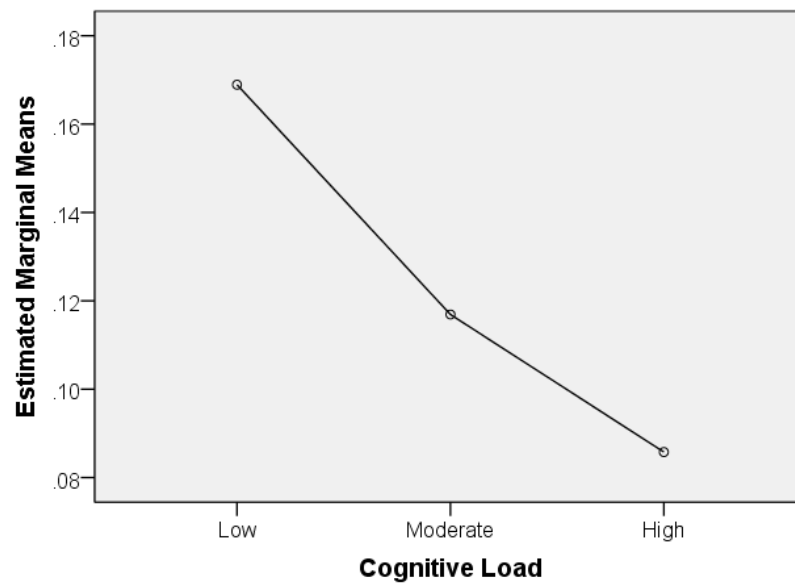
Table 5-43 – Effect of Cognitive Load on Immediate Message Recall

	F	df	Sig.	η_p^2
Cognitive Load	9.56	2	.00	.06
Working Memory Capacity	4.42	1	.03	.02
Need for Cognition	0.20	1	.88	.00

Table 5-44 – Pair-wise Comparison of Cognitive Load on Immediate Message Recall

Cognitive Load (I)	Cognitive Load (J)	Mean Difference (I-J)	Sig.^a
Low	Moderate	0.05	.02
	High	0.08	.00
Moderate	Low	-0.05	.02
	High	0.03	.31

a – Sidak adjustment for multiple comparisons was applied

Figure 5-11 – Means Profile of Immediate Message Recall for Cognitive Load

Covariates appearing in the model are evaluated: NFC = 4.97, WM Capacity = .77

5.8.2.2 *Effect of Cognitive Load on Delayed Memory*

A procedure similar to testing the effects of Cognitive Load on Immediate Message Recall was adopted, the results of which are presented in Table 5-45 and Table 5-46.

Table 5-45 - Effect of Cognitive Load on Delayed Message Recall

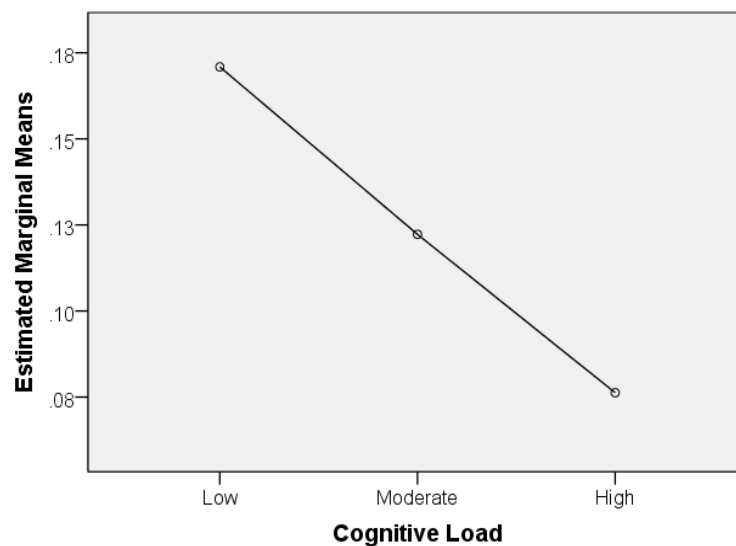
	F	df	Sig.	η_p^2
Cognitive Load	12.79	2	.00	.08
Working Memory Capacity	0.37	1	.54	.00
Need for Cognition	2.05	1	.11	.01

Table 5-46 – Pair-wise Comparison of Cognitive Load on Delayed Message Recall

Cognitive Load (I)	Cognitive Load (J)	Mean Difference (I-J)	Sig. ^a
Low	Medium	0.05	.03
	High	0.10	.00
Medium	Low	-0.05	.03
	High	0.05	.05

a – Sidak adjustment for multiple comparisons was applied

Accordingly, Cognitive Load showed a significant effect on Delayed Message Recall ($F(2, 279) = 12.79, p < .01$) with a moderate effect size ($\eta_p^2 = 0.08$). A pair-wise comparison of the Cognitive Load groups revealed that the effect was significant across all groups (see Table 5-46) except for the mean difference between moderate and high levels of Cognitive Load, which appeared to be marginally significant ($\Delta M = 0.05, p < .10$). The mean profile shown in Figure 5-12 indicates that the relationship between the Cognitive Load and Delayed Message Recall was linear.

Figure 5-12 - Means Profile of Delayed Message Recall for Cognitive Load

Covariates appearing in the model are evaluated at : NFC = 4.95, WM Capacity = .77

The influence of the Working Memory Capacity was somewhat surprising compared to what had been revealed in the other results. In other words, this effect appeared to be insignificant ($F(1,279) = 0.371, ns$). However, not surprisingly, the effect of Need for Cognition remained insignificant.

5.9 PATH ANALYSIS OF INDIVIDUAL COMPONENT MODEL

The analysis presented earlier examined the effects of the model individually. However, it failed to capture the path effects of the model as a whole and thus a path analysis using Partial Least Squares approach was adapted. Due to the fact that the previous analysis indicated the existence of significant relationships between components, this analysis served the purpose of finding the relative importance of the paths between the constructs. The software used in this analysis was smartPLS version 2.0.M3 (Ringle, Wende, & Will, 2005).

5.9.1 Measurement Model Evaluation

It is important to note the different type of indicators used in this analysis. They are either formative or reflective. All constructs except for recall memory were treated as reflective while the recall memory constructs were treated as formative for the reason that they constitute different aspects of memory. These differences required different procedures for confirming the validity and reliability of the measurement model. Therefore, the following section explains the respective procedures followed to ensure the validity and reliability of each construct.

5.9.1.1 *Reflective Constructs*

As opposed to formative constructs, it was important to substantiate the validity and reliability of the reflective constructs prior to further analysis. The validity of the items was tested with both discriminant and convergent criteria (Hair, Ringle, & Sarstedt, 2011). According to Chin (2010), this can be achieved if each item in a construct demonstrates a strong connection with that construct without a stronger connection with any other construct in the model. Therefore, as shown in Table 5-47, the loading and the cross loading scores were examined with each construct represented in columns

for determining convergent and discriminant validity respectively. Finally, to test whether a construct has more variance associated with its own indicators than with the other constructs, Fornell and Larcker (1981) criteria were adopted. Accordingly, Average Variance Extracted (AVE) values of a given construct should be greater than the highest squared values of the correlation of that construct with any other construct in the model.

Table 5-47 - Outer Model Loading and Cross Loading of Reflective Constructs

	CRCE	CPLX	PDS	CLD	ATT
FT1	0.951	-0.407	-0.558	-0.518	0.755
FT2	0.975	-0.440	-0.612	-0.582	0.768
FT3	0.967	-0.435	-0.573	-0.565	0.719
DF1	-0.197	0.839	0.320	0.554	-0.367
DF2	-0.439	0.872	0.509	0.737	-0.466
DF3	-0.478	0.890	0.469	0.704	-0.572
CD1	-0.623	0.470	0.933	0.613	-0.746
CD2	-0.533	0.456	0.921	0.605	-0.691
CD3	-0.501	0.479	0.905	0.598	-0.633
CL1	-0.452	0.709	0.523	0.883	-0.523
CL2	-0.503	0.758	0.649	0.926	-0.624
CL3	-0.556	0.541	0.533	0.792	-0.562
AT1	0.766	-0.543	-0.704	-0.644	0.964
AT3	0.758	-0.519	-0.752	-0.629	0.969
AT4	0.729	-0.530	-0.731	-0.636	0.974

CRCE - Perceived Music Congruence; CPLX - Perceived Message Complexity; PDS - Psychological Discomfort; CLD - Cognitive Load; ATT - Attitude towards Advertisement

The value of each item in the matrix was examined against the values along each row and column (except for the values of the same construct) to detect any violation of discriminant validity. Accordingly, if the value of an item in other cells (except for those of its own construct) was greater than the value corresponding to its construct, the item was deemed to be cross loaded (Hair, Hult, Ringle, & Sarstedt, 2014). The result of this procedure revealed that some items used in the model had mainly discriminant validity issues. However, this was not surprising considering that the same items were identified as problematic in similar analyses carried out previously. As a corrective measure, two items (DF4 and DF5) from Perceived Complexity Scale, two items (CL4 and CL5) from Cognitive Load Scale, and one item each from Music Congruence

(FT4) as well as Attitude (FT2) scales were eliminated. The analyses obtained after such corrections confirmed the presence of item level discriminant validity.

Nonetheless, the above procedure was considered somewhat liberal in nature (see Hair et al., 2014) and therefore, all the constructs were further tested for previously mentioned Fornell and Larcker criteria. For calculation purposes, instead of squaring correlation values (R), the square root of AVE was compared against the R value of each construct. This test (see Table 5-48) indicated that every reflective construct met the criteria. i.e., the \sqrt{AVE} was the highest of the values listed in each corresponding column of a construct. Hence, it was safe to claim that the discriminant validity of the measurements had been met.

Table 5-48 - Fornell-Larcker Criterion Analysis

Construct	CRCE	CPLX	PDS	CLD	ATT
Music Congruence (CRCE)	<i>0.964</i>				
Message Complexity (CPLX)	-0.443	<i>0.867</i>			
Psychological Discomfort (PDS)	-0.603	0.509	<i>0.920</i>		
Cognitive Load (CLD)	-0.577	0.776	0.658	<i>0.869</i>	
Attitude towards Ad (ATT)	0.775	-0.547	-0.753	-0.657	<i>0.969</i>
Immediate Recall (IRCL)	0.292	-0.259	-0.353	-0.286	0.373
Immediate Recognition (IREC)	0.034	-0.248	-0.172	-0.251	0.097
Delayed Recall (DRCL)	0.161	-0.307	-0.309	-0.316	0.245
Delayed Recognition (DREC)	0.063	-0.167	-0.143	-0.148	0.074

Values in bold and italic: \sqrt{AVE} of the respective construct

Reliability was determined by examining three indicators of each reflective construct - item loadings, composite reliability, and AVE. It is normally considered that the correlation between an item and the corresponding construct should be not less than 0.4, while it is preferable to have values above 0.7 (Hair et al., 2011). AVE value being greater than 0.5 is preferable as it indicates that all the items of that construct explain more than 50% of the variance. The results of these analyses after eliminating the validity issues are shown in Table 5-49. Accordingly, all the indicators appear to be well above the recommended loading level (0.7). Further, Chin (2010) suggested that the closer the indicator loadings, the better does it explain the construct. The loadings as a result of this analysis also accord with that suggestion. Additionally, the composite

reliability scores associated with all the constructs also had values above the accepted level (0.6) and the AVE values were well above the standard level of 0.5. Therefore, based on this evidence, it was concluded that all the indicators of the reflective constructs used in this study were reliable.

Table 5-49 - Reflective Constructs Outer Model Reliability

Construct / Item	Loading	Average Variance Extracted (AVE)	Composite Reliability	Cronbach's α
<u><i>Music Congruence</i></u>		0.93	0.98	0.96
FT1	0.95			
FT2	0.97			
FT3	0.97			
<u><i>Message Complexity</i></u>		0.75	0.90	0.84
DF1	0.84			
DF2	0.87			
DF3	0.89			
<u><i>Psychological Discomfort</i></u>		0.85	0.94	0.91
CD1	0.93			
CD2	0.92			
CD3	0.90			
<u><i>Cognitive Load</i></u>		0.76	0.90	0.84
CL1	0.88			
CL2	0.93			
CL3	0.79			
<u><i>Attitude towards Advertisements</i></u>		0.94	0.98	0.97
AT1	0.96			
AT3	0.97			
AT4	0.97			

5.9.1.2 Formative Constructs

Formative constructs are multidimensional in nature and they do not necessarily highly correlate (Chin, 2010; Hair et al., 2014). Accordingly, there were two formative constructs used in this study, Immediate Recall and Delayed Recall. Both of these constructs consisted of respective Brand Recall, Category Recall, and Message Recall indicators.

Since the indicators in a formative construct are not interchangeable, high correlation among such is not expected (Hair et al., 2014). Thus, it is important to assess the existence of any collinearity among the indicators of each formative construct. For this purpose, tolerance value and Variance Inflated Factor (VIF) were considered. According to Hair et al. (2011), a VIF value greater than or equal to 5.00 indicates that the formative indicator has a multicollinearity issue, and a tolerance value less than 0.2 also indicates the same.

VIF values were calculated using Linear Regression in SPSS. Accordingly, all the items were considered as independent variables and collinearity statistics were obtained. The results of this analysis are presented in Table 5-50.

Table 5-50 - Collinearity Assessment of Formative Indicators

Formative Indicators	Tolerance	VIF
<i><u>Immediate Recall</u></i>		
Category Recall	.69	1.45
Brand Recall	.69	1.46
Message Recall	.67	1.50
<i><u>Delayed Recall</u></i>		
Category Recall	.71	1.42
Brand Recall	.70	1.43
Message Recall	.68	1.47

VIF and tolerance values of each indicator revealed that they were well within the accepted level and hence, it could be said that the formative indicators of this model did not suffer from multicollinearity issues.

The collinearity assessment was followed by an evaluation of the outer weights and their significance associated with each manifest variable. As shown in Table 5-51, Message Recall indicated a significant contribution to both Immediate and Delayed Recall constructs ($t_{IMR}(283) = 6.15, p < .01$; $t_{DMR}(283) = 11.74, p < .01$). However, none of the other indicators appeared to be significant in terms of outer weights. This finding was not surprising considering findings in the previous analysis where Brand and Category Recall were not significantly different between the groups (see Section 5.8).

However, it was decided to retain these items in the further analysis in order to make both the analyses consistent in terms of their indicators. It should also be noted that the literature highlights that the theoretical rationale plays a significant role over its empirical counterpart when considering the indicators of a formative construct (Hair et al., 2011).

Table 5-51 - Outer Weights Significance Testing for Formative Construct

	Outer Weights (Outer Loadings)	t Value	Sig.
<i><u>Immediate Recall</u></i>			
Category Recall	0.071 (0.270)	0.368	0.71
Brand Recall	0.298 (0.589)	1.481	0.14
Message Recall	0.842 (0.957)	6.152	0.00
<i><u>Delayed Recall</u></i>			
Category Recall	-0.219 (-0.065)	1.317	0.19
Brand Recall	0.030 (0.332)	0.164	0.87
Message Recall	1.000 (0.976)	11.740	0.00

5.9.2 Structural Model Evaluation

Following on from the measurement model evaluation, the structural model was evaluated to establish the estimates of all the paths. However, prior to such analysis it is important to determine that the predictors of the latent constructs are free from collinearity issues to ensure that the path coefficients are free from bias (Hair et al., 2014). Accordingly, there were two subsets of constructs identified as shown in Table 5-52. Comparable to the evaluation criteria mentioned previously in formative indicator assessment, the results indicate that all the subsets of the model resided well within the accepted level.

Table 5-52 - Collinearity Assessment of the Structural Model

Set 01		Set 02	
Construct	VIF	Construct	VIF
CMPLX	1.374*	CLD	1.175*
CRCE	1.615*	PDS	1.175*
PDS	1.757*		

* $VIF < 5.00$

After establishing the pre-requisites of the analysis, the path coefficients and the significance level of each were determined. The hypothesised model is presented in Figure 5-13. In this figure, the path coefficients are displayed on the lines and the coefficients of determination (R^2) along with predictive relevance (Q^2) are shown inside each circle to denote a construct. The path coefficients and the t-statistics were obtained through the Bootstrapping procedure. This nonparametric method was used to obtain the precision of the model estimates (Chin, 2010) and in this case 5,000 sample sets with 284 cases in each were adopted.

Table 5-53 – Results of the Structural Model Path Coefficient

Structural Path			Path β	t	p	Sig
Music Congruence	→	Psychological Discomfort	-.60	13.97	.00	**
Message Complexity	→	Cognitive Load	.57	14.88	.00	**
Music Congruence	→	Cognitive Load	-.16	3.45	.00	**
Psychological Discomfort	→	Cognitive Load	.27	5.98	.00	**
Psychological Discomfort	→	Attitude towards Ad	-.57	11.33	.00	**
Cognitive Load	→	Attitude towards Ad	-.29	5.27	.00	**
Cognitive Load	→	Immediate Recall	-.29	5.31	.00	**
Cognitive Load	→	Immediate Recognition	-.25	4.72	.00	**
Cognitive Load	→	Delayed Recall	-.32	6.57	.00	**
Cognitive Load	→	Delayed Recognition	-.15	2.73	.00	**

** $p < .01$; * $p < .05$; ns – not significant

This analysis produced results similar to those of the analysis performed previously for testing the research hypotheses (see Table 5-53). Accordingly, the largest coefficient was reported on the path leading to Psychological Discomfort from Music Congruence

($\beta = -.60, p < .01$), while the smallest coefficient was represented on the path between Cognitive Load and Recognition memory ($\beta = -.15, p < .01$).

In addition to the analysis of individual paths of the model, it is also important to assess the total effects that exogenous constructs have on endogenous constructs. They were the effects that two manipulations, Message Complexity and Music Congruence, had on six other constructs: Cognitive Load, Attitude towards Advertisement, two immediate memory measures, and two delayed memory measures. These were analysed in 11 different relationships for their significance. This result is shown in Table 5-54. Accordingly, all such relationships appeared to be significant.

Table 5-54 - Results of the Total Effects

Structural Path (Exogenous → Endogenous)			Total Effect	t	p	Sig.
Music Congruence	→	Cognitive Load	-0.33	8.21	.00	**
Music Congruence	→	Attitude towards Ad	0.43	10.70	.00	**
Music Congruence	→	Immediate Recall	0.09	4.27	.00	**
Music Congruence	→	Immediate Recognition	0.08	4.35	.00	**
Music Congruence	→	Delayed Recall	0.10	5.30	.00	**
Music Congruence	→	Delayed Recognition	0.05	2.62	.00	**
Message Complexity	→	Attitude towards Ad	-0.16	4.83	.00	**
Message Complexity	→	Immediate Recall	-0.16	5.04	.00	**
Message Complexity	→	Immediate Recognition	-0.14	4.33	.00	**
Message Complexity	→	Delayed Recall	-0.18	5.78	.00	**
Message Complexity	→	Delayed Recognition	-0.08	2.63	.00	**

** $p < .001$; * $p < .05$; ns – not significant

The predicted model is shown in Figure 5-13, which indicates that 71% of Cognitive Load was cumulatively explained by perceived Message Complexity, perceived Music Congruence, and Psychological Discomfort. The total variance of Psychological Discomfort explained by Music Congruence alone was 36%. The path coefficients suggested that Cognitive Load was predominantly affected by the Message Complexity ($\beta = .57, t(283) = 14.88, p < .01$), the attenuation of which was denoted by a negative coefficient ($\beta = -.16, t(283) = 3.45, p < .01$). It was also confirmed that Psychological Discomfort increased the felt Cognitive Load ($\beta = .27, t(283) = 5.98, p < .01$). In addition to Cognitive Load, the Attitude towards Advertisement was

also explained strongly by the suggested model ($R^2 = .36$) and it was mainly explained by the effects of Psychological Discomfort ($\beta = -.56, t(283), p < .01$) rather than that of Cognitive Load ($\beta = -.29, t(283) = 5.27, p < .01$).

The R^2 value of Immediate Recall memory was 8% while Immediate Recognition memory explained by the present model remained somewhat weak (6%). The coefficient of determination associated with Delayed Recall and Delayed Recognition memory were 10% and 02% respectively. It appeared that the effect of Cognitive Load was most on Delayed Recall Memory while it was least on Delayed Recognition memory.

Table 5-55 – Coefficient of Determination of Endogenous Constructs of the Model

Endogenous Construct	Coefficient of Determination (R^2)
Psychological Discomfort	.36
Cognitive Load	.71
Attitude towards Advertisement	.61
<i>Immediate Memory</i>	
Immediate Recall	.08
Immediate Recognition	.06
<i>Delayed Memory</i>	
Delayed Recall	.10
Delayed Recognition	.02

The importance of the values associated with R^2 varies depending on the complexity of the model and the discipline. Though a value of 0.75 is regarded as strong in ordinary situations, a value of 0.20 is also considered strong in disciplines such as consumer behaviour (Hair et al., 2014; Hair et al., 2011). According to this line of thought, it could be said that Cognitive Load, Psychological Discomfort, and Attitude towards Advertisement indicated a very strong associated variance. Of these, Cognitive Load indicated the strongest variance, followed by Attitude towards Advertisement and Psychological Discomfort in that order. According to Hair et al. (2014), Delayed Recall memory showed a moderate variance while other memory measures appeared to have weak associated variances.

5.9.3 The Predictive Accuracy Effect f^2

The predictive accuracy of each endogenous construct was determined by calculating f^2 statistics. When R^2 explains the total effect size of a given endogenous construct of the model, f^2 statistics explains the change in R^2 value as a result of omitting an exogenous construct (Hair et al., 2014). This evaluation helps to determine whether a particular construct has a substantial effect on the concerned construct (Hair et al., 2014). Consequently, these effect sizes will explain the relative contribution of that exogenous construct. Cohen (1988) provided a benchmark for comparing such effect sizes based on a similar statistic. Accordingly, 0.02, 0.15, and 0.35 can be regarded as small, medium, and large effects when multiple exogenous constructs are involved. These values will be 0.01, 0.10, and 0.33 with the respective sizes, if the dependent construct has only a single independent construct. The equations used to calculate f^2 in this analysis are shown in Equation 5-1;

$$f^2 = \frac{R_{included}^2 - R_{excluded}^2}{1 - R_{included}^2} \} \text{ with multiple exogenous constructs}$$

5-1

$$f^2 = \frac{R_{included}^2}{1 - R_{included}^2} \} \text{ with a single exogenous construct}$$

The results shown in Table 5-56 were derived by calculating $R_{included}^2$ value with all antecedent constructs and rerunning PLS-SEM algorithm after removing a single antecedent construct at a time to obtain the $R_{excluded}^2$. This procedure was repeated for each latent variable in the model.

Table 5-56 - Path Coefficients, f^2 and q^2

	PDS			CLD			ATT		
	β	f^2	q^2	β	f^2	q^2	β	f^2	q^2
CRCE	-0.603	0.572 [*]	0.437 [*]	-0.161	0.052 ⁺	0.025 ⁺			
CMPLX				0.566	0.779 [*]	0.362 [*]			
PDS				0.273	0.145 [#]	0.062 ⁺	-0.565	0.470 [*]	0.388 [*]
CLD							-0.285	0.116 [#]	0.094 ⁺

	IRCL			IREC			DRCL		
	β	f^2	q^2	β	f^2	q^2	β	f^2	q^2
CLD	-0.286	0.089 [#]	na	-0.251	0.067 ⁺	0.057 ⁺	-0.316	0.111 [#]	na

	DREC		
	β	f^2	q^2
CLD	-0.148	0.022 ⁺	0.030 ⁺

* Strong # Medium + Small

Referring to this result, it could be said that Psychological Discomfort was strongly predicted by Music Congruence ($f_{CRCE \rightarrow PDS}^2 = .572$) and the negative β value suggested that it was negatively related. Both Message Complexity and Music Congruence affected Cognitive Load in a manner that perceived complexity strongly predicted Cognitive Load ($f_{CMPLX \rightarrow CLD}^2 = .779$). Despite the fact that congruent music inclined to reduce Cognitive Load, its effect remained small ($f_{CRCE \rightarrow CLD}^2 = .052$) compared to that of Message Complexity. The contribution of Psychological Discomfort to Cognitive Load appeared to be moderate ($f_{PDS \rightarrow CLD}^2 = .145$) in the present context. Out of the two antecedent constructs, Psychological Discomfort ($f_{PDS \rightarrow ATT}^2 = .470$) had a more prominent effect on Attitude with high predictability, while that of Cognitive Load appeared to be close to moderate ($f_{CLD \rightarrow ATT}^2 = .116$).

Though the model predicted that Cognitive Load determines the immediate and delayed Memory for the contents of an advertisement, the effect sizes in all cases appeared to be relatively small. Out of the memory constructs, only the Delayed Recall Memory was predicted with moderate effect size ($f_{CLD \rightarrow DRCL}^2 = .111$). However, it was also observed that both Immediate Recall and Delayed Recall constructs were better predicted by Cognitive Load than those of Recognition Memory.

5.9.4 Predictive Relevance Effect q^2

In order to determine how well the observed values are reconstructed by the model parameter estimates, a procedure call Blindfolding, referred to earlier, was adopted (Chin, 2010). This is done by deleting values in a specified distance (called omission distance, and in this case it was set to 7) and subsequently predicting the value using model parameters. At the end of this procedure, predicted values are compared with the actual value to determine the prediction error. The lower is the prediction error, the higher is the predictive ability of the model (see Hair et al., 2014 for details of the procedure). However, Blindfolding is only applicable to reflective constructs and will not be used on formative constructs. Since this model has both types of constructs, the calculation of q^2 was only done for appropriate latent constructs. After calculating predictive relevance (Q^2) value, predictive relevance effect size (q^2) was calculated using the same formulas of f^2 (see Equation 5-1), where Q^2 was assigned in place of R^2 . Consequently, Cohen (1988) criteria are used to interpret the values.

A comparable procedure for calculating predictive accuracy was adopted for all the constructs, except for the formative constructs. This measurement for some paths were not obtained and therefore marked as ‘na’ in Table 5-56.

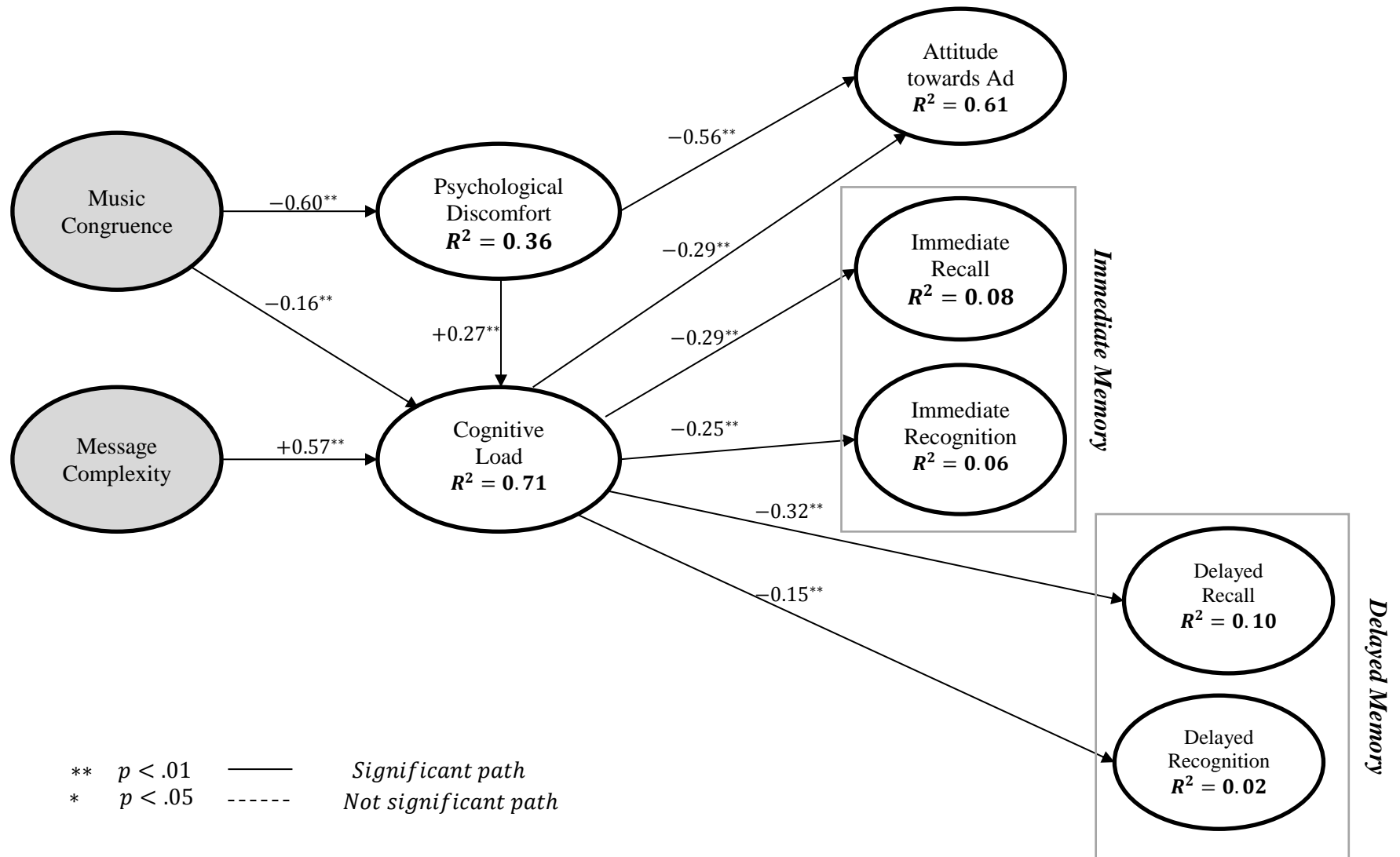
A latent construct is said to have predictive relevance if the Q^2 value is above zero (Chin, 2010). Accordingly, all the latent constructs in the proposed model demonstrated their predictive relevance in the model. Thus, effect sizes were examined subsequently using a procedure analogous to f^2 calculations in the previous section except for running the Blindfolding algorithm in place of PLS algorithm.

The q^2 value associated with Psychological Discomfort was high ($q_{CRCE \rightarrow PDS}^2 = .437$) with Music Congruence. As expected, the highest predictive relevance for Cognitive Load was recorded with Message Complexity ($q_{CMPLX \rightarrow CLD}^2 = .362$), while Music Congruence had the least accompanying value ($q_{CRCE \rightarrow CLD}^2 = .052$). Though it had a medium level of predictive accuracy (f^2), the q^2 value ($q_{PDS \rightarrow CLD}^2 = .062$) appeared to be somewhat small in the case of Psychological Discomfort. Attitude towards Advertisement was predominantly predicted by Psychological Discomfort ($q_{PDS \rightarrow ATT}^2 = .388$) with a large effect size. However, the predictability of Cognitive Load on the

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same remained somewhat low ($q_{CLD \rightarrow ATT}^2 = .094$). Immediate and Delayed recognition memory once again were associated with low effect sizes ($q_{CLD \rightarrow IREC}^2 = .057$; $q_{CLD \rightarrow DREC}^2 = .030$). Due to the formative nature of the constructs, the predictive relevance of Immediate Recall and Delayed Recall was not calculated.

Figure 5-13 – Results of the Structural Model of the Conceptual Model



5.9.5 Mediation Effect Analysis

It is also important to look for the possible mediations in the structural model as such mediation effects would reveal information about possible casual mechanisms (Shrout & Bolger, 2002). Mediation effect analysis mainly investigates how, or by what means, an independent variable affects a dependent variable through one or more potential intervening variables (Preacher & Hayes, 2008, p. 879). In the baseline model shown in Figure 5-13, the effect of Music Congruence on Cognitive Load was partially mediated through Psychological Discomfort. In order to examine these effects, the procedure explained by Hair et al. (2014) was adopted.

Baron and Kenny (1986) stated three conditions that have to be met for any variable to be deemed a mediator: a) variation in the independent variable should significantly account for the variations in the potential mediator; b) variation in the potential mediator should be significantly accounted for by the variations in the dependent variable, and c) when the other two variables are controlled, the direct effect between the independent and the dependent variables should significantly change. The first two criteria were met by both sets of variables as shown in Table 5-53. Hence, the third criterion was first analysed through determining the path coefficients of the direct effects without the mediator, and then recalculating the path coefficients of both direct and indirect effects after adding the mediators into the model. Lastly, the relative effects were calculated to determine the mediation effect. The results of these separately conducted processes are presented in Table 5-57.

Table 5-57 - Mediating Testing Results

Path	β	Std. Err	t	sig	VAF
<i>Music Congruence → Cognitive Load</i>					
Direct effect without mediation*	-.290	0.042	6.896	.00	
Indirect effect through PDS	-.165	0.029	5.169	.00	51%
<i>Psychological Discomfort → Attitude towards Ad</i>					
Direct effect without mediation*	-.754	0.029	26.391	.00	
Indirect effect through CLD	-.078	0.016	4.930	.00	12%

* - When the mediator construct was removed from PLS-SEM model

Variance Accounted For (VAF) being 51% indicated that the effect of Music Congruence on Cognitive Load was partially mediated through Psychological Discomfort. This finding suggested that Music Congruence had both direct and indirect effects on the dependent variable. However, the Psychological Discomfort effect on Attitude towards Advertisement had a VAF value less than 20%, indicating the presence of only direct effects. In other words, the evidence was not strong enough to claim that Psychological Discomfort had a mediation effect on Attitude towards Advertisement through Cognitive Load.

5.9.6 Goodness of Fit (GoF)

Despite the fact that many models using structural equation modelling methods emphasize how well a model fits a set of observations, such measurement would be suitable for covariance based structural equation modelling (CB-SEM) with reflective constructs (Chin, 1998). Though Tenenhaus and Amato (2004) proposed a global goodness of fit index that could be used in a PLS-SEM context, it is still questioned whether such criteria truly represent the global fit as such methods use averages of communality values and R^2 values. Specifically, the models that constitute formative constructs and constructs with a single manifest variable do not qualify for this criterion (Chin, 1998; Hair et al., 2014; Hair, Sarstedt, Ringle, & Mena, 2012). One of the main reasons is that part of global GoF uses the average of the correlations of the manifest variables (items of a construct) to the corresponding latent construct. Hence the commonality values are considered (Henseler & Sarstedt, 2013). However, the manifested variables of a formative construct will not be based on the commonality values for the reason that the indicators represent different aspects of a construct (Hair et al., 2014). In other words, changes of the unobserved latent construct are not necessarily reflected in the changes of the respective manifest variables (Chin, 1998). “Consequently, the application and interpretation of the GoF for models involving formative measurement cannot be universally recommended” (Henseler & Sarstedt, 2013, p. 570). Additionally, Chin (2010) noted that models with formative indicators have a natural trade-off between predictability of the inner model and the outer model which suggests that this index is less useful with such models.

Constructs with a single manifest variable also contribute to the same issue. In other words, such constructs will have a commonality value of 01 due to single manifest variable to explain the variations of the latent construct. Hence, "... it does not permit to quantify the measurement error in the indicator " (Henseler & Sarstedt, 2013, p. 570). Thus, in such a context as well, the purpose of using GoF is not served.

As mentioned earlier, the model used in this research was a mixed model with both reflective constructs and formative constructs. Furthermore, it has three latent constructs with a single manifest variable. Therefore, goodness of fit index would not be applicable in explaining the model fit.

5.10 SUMMARY

The purpose of this chapter was to test the 15 hypotheses proposed in Chapter 3. In achieving this, the analysis was conducted in two main stages. The first stage comprised of testing the individual hypothesised relationships while the second stage presented the results of the path analysis having considered the entire proposed model as a whole.

Hypothesis 1 was related to the ability of music to generate Psychological Discomfort while Hypothesis 2 proposed a positive causal effect of Message Complexity on the felt Cognitive Load. The analysis revealed that the first two hypotheses were supported. Hypotheses 3 and 4 were concerned with the effects on Cognitive Load as a result of Music Congruence and Psychological Discomfort. More specifically, Hypothesis 3 predicted that congruent music would be able to attenuate the felt Cognitive Load while Hypothesis 4 purported that the increased level of Psychological Discomfort would compete for cognitive resources, which would eventually be reflected in Cognitive Load. The results indicated that both of these hypotheses were also supported.

The research explored the effectiveness of an advertisement from two aspects -affective and cognitive. The affective aspect was measured with the Attitude towards Advertisement and the cognitive aspect was measured with Recall and Recognition memory. Accordingly, Hypothesis 5 and 6 were related to the effects of Cognitive Load and Psychological Discomfort on Attitude towards Advertisement respectively. The

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data appeared to suggest the existence of significant relationships between these, which supported the above two hypotheses.

The results of the analysis also supported Hypotheses 7a to 7c. The three hypotheses were related to cognitive resource pressure purporting that a) Cognitive Load would be significantly lower for the simple message combined with congruent music than the simple message combined with incongruent music; b) the simple message combined with incongruent music would exert the same Cognitive Load as the complex message combined with congruent music; c) the complex message combined with incongruent music exerted the highest cognitive pressure and it would be significantly higher than the same message combined with congruent music.

The final set of hypotheses was related to the resultant memory effects by the level of Cognitive Load. Though this relationship was hypothesised to be non-linear (inverted “U” curve), the data suggested that the relationship was negative and linear. The same results were repeated in the delayed memory measures as well. Thus, Hypotheses 8a, 8b, 9a, and 9b were not supported. The remaining two hypotheses -Hypotheses 9c and 9d- were concerned with the within-subject differences between the immediate and delayed memory measures across Cognitive Load. Accordingly, it was expected to have significant differences at the low and high levels of Cognitive Load, but not at the moderate level. However, this hypothesis was only supported in Recall Memory but not in Recognition memory, and hence, only Hypothesis 9c was supported.

The path analysis conducted using Partial Least Squares Structural Equation Modelling (PLS-SEM) revealed the same results. An additional mediation analysis revealed the existence of a partial mediation effect between Music Congruence and Cognitive Load through Psychological Discomfort but only significant direct effects between Psychological Discomfort and Attitude through Cognitive Load. A detailed discussion of these findings is presented in Chapter 6.

6 DISCUSSION AND CONCLSION

6.1 INTRODUCTION

This chapter discusses the findings of the experiment described in the previous chapter. First, it starts by summarising the purpose followed by a discussion of the findings relating to each hypothesised relationship in the model. Then, the managerial and theoretical contributions are presented before discussing the limitations of the present study. Future research directions are discussed at the end.

6.2 OVERVIEW

6.2.1 Summary of Research Purpose

Despite the growing use of music in advertisements and the colossal amount of money spent on it (Oakes & North, 2006), little is known about the actual psychological effects of such use in advertisements. Especially, from the point of view that an advertisement is a *bundle* of stimulus elements, the literature has not investigated the way musical stimuli in an advertisement influence the message stimulus with differential complexities designed to communicate information. Furthermore, the lack of a theoretical understanding is also evident in the resultant psychological states of these two salient stimuli and the way cognitive resources are utilised in processing an advertisement.

Several psychological theories are used as the basis of the conceptual model: Cognitive Dissonance Theory, Cognitive Load Theory, Gestalt Theory of Psychology, Limited Capacity Model of Motivated Mediated Messages Processing (LC4MP), and Resource-Matching (RM) Hypothesis. The model particularly suggests that the stimulus characteristics of an advertisement cause certain cognitive states, which will in turn determine the demand for and utilisation of cognitive resources from the pool of cognitive resources available for processing the advertisement. These psychological states will eventually determine the effectiveness of an advertisement from the affective and cognitive perspectives.

6.2.2 Summary of Findings

In order to test the hypothesised relationships between the constructs of the model, an online experiment was conducted on a mixed sample of participants. Additionally, a Path Analysis was carried out to evaluate the simultaneous effects of these hypothesised relationships.

Of the 15 tested hypotheses, ten were supported and this section summarises the findings on these hypotheses. Accordingly, the data supported the proposed notion of music's ability to generate dissonance characterised by psychological discomfort when it is incongruent or loosely coupled with the message stimulus of the advertisement. Consequently, this psychological discomfort state demands more resources and hence increases the felt cognitive load. In contrast, music brings in Gestalt effects and attenuates the cognitive resource pressure when it becomes congruent with the message. It is also found that the multiple informational structures in a message demand more of cognitive resources than does a simply structured message. Hence, the characteristics of these two salient stimuli in an advertisement eventually determine the pressure exerted by an advertisement on the cognitive processing system of a consumer.

As hypothesised, increased levels of dissonance and cognitive load reduce attitude towards advertisement. These effects appear to be direct and the effects of psychological discomfort are not mediated through cognitive load. Hence, this research also finds support for the *affective primacy* hypothesis proposed by Zajonc (1980).

The relationship between cognitive load and immediate as well as delayed memory were not as expected. In other words, instead of an inverted "U" curve, a negative linear relationship was found. This suggests that the lower the cognitive load is, the better the effectiveness of an advertisement becomes. At the same time, the behaviour of cognitive load across the experiment condition provides support for the conclusion that it is not complexity *per se*, but cognitive load that plays a significant role in determining the effectiveness of an advertisement. This, in a way, challenges the existing rule of thumb -having a "simple and stupid" message is the best. Additionally, it is also found that the retention of the contents of an advertisement becomes superior in a low cognitive load condition than in a high cognitive load condition owing to

effective utilisation of the storage process. Similarly, retention is adversely affected in a high load condition. The following section discusses in detail the findings relating to each hypothesis.

6.3 RESEARCH FINDINGS

6.3.1 Effect of Music Congruence on Psychological Discomfort

This study shows that incongruent music in an advertisement is capable of generating incongruent cognitions. These cognitions pertain to the product being communicated in the message and the background music as a whole. The presence of any inconsistency between these two cognitions would cause a dissonance state characterised by psychological discomfort. The data in this study supports this notion in such a manner that the congruency of music is inversely related to dissonance (see Table 5-13, p. 141). This state is considered a *dissonance* state for the reason that the psychological discomfort generated in this regard is mainly due to inconsistency.

Dissonance could be one of the reasons for incongruent music in an advertisement found in past research to be disturbing (e.g. Kellaris et al., 1993; North, Mackenzie, et al., 2004; Oakes & North, 2006; Park & Young, 1986) and therefore, the present findings could be used as an alternative explanation for some previous findings. Additionally, on a few occasions, researchers suggested that the incongruent elements of an advertisement could cause a feeling of helplessness or of frustration (e.g. Hung, 2000; Meyers-Levy & Tybout, 1989). Though the contexts of such research and those of the present study do not totally overlap, the notion of inconsistency leading to frustration is empirically supported by the present study's notion of incongruence-elicited psychological discomfort. Additionally, some researchers have reported that musical incongruence has the ability to provoke negative feelings (Macinnis & Park, 1991), the cause of which can also be attributed to the experience of dissonance. Hence, the present finding provides valuable empirical evidence of the existence of such a psychological state.

It further suggests that dissonance is not an entirely behaviour-induced phenomenon but can also be caused by inconsistent cognitions generated by other sources (Cooper,

2010; Elliot & Devine, 1994), which in the present context is incongruent music. The general thinking is that in order to experience dissonance, the person must perform an act (see Elliot, 1992). Nonetheless, evidence can be found in the literature pointing in the direction that a similar cognitive state could also arise even without a person performing an act. For instance, *vicarious dissonance* is a state of dissonance that arises based on an act of an in-group member (Cooper, 2010). However, one could still argue that self-importance is essential for this (e.g. Holland et al., 2002; Kelman & Baron, 1974) and any act getting exposed to music in an advertisement would not have the power to generate dissonance. Alternatively, it could also be argued that when a set of stimuli is presented to a consumer, cognitions will be generated pertaining to each of these stimuli and he/she expects some degree of consistency between them. When such cognitions are perceived to be inconsistent, the resultant state of discomfort is a form of dissonance though it may not demonstrate every characteristic of dissonance. The finding of this study supports this notion.

Additionally, the current findings could also be related to Kelman and Baron (1974)'s categorisation of Moral and Hedonic Dissonance (see Section 2.3.2). Research on the hypocrisy paradigm (Stone, Wiegand, Cooper, & Aronson, 1997) falls under *moral* dissonance while *hedonic* dissonance holds transitory and superficial characteristics. Analogous to the context of Holland et al. (2002)'s study, stimulus processing of an advertisement would be unlikely to challenge the innate values of a consumer unless the message contains information challenging such value. In this case, the message does not contain self-challenging information and hence, psychological discomfort can be predominantly attributed to the congruence nature of the music. Though this research did not gather any data in this area, it was more likely that the dissonance reduction would be done by trivialising (Festinger, 1957) the context within which it occurs. Thus, the nature of dissonance occurring here is more likely to be hedonic.

6.3.2 Effect of Music Congruence on Cognitive Load

The results of this study indicate that congruent music has a negative effect on cognitive load, suggesting that music, when congruent, attenuates perceived cognitive load (see Table 5-15, p. 143). This finding provides an alternative explanation for congruent music being more effective in many situations than no music condition (e.g.

Lavack, Thakor, & Bottausci, 2008; North, Mackenzie, et al., 2004) or its incongruent counterparts (e.g. Kellaris et al., 1993). For instance, North, Mackenzie, et al. (2004) use Activation Theories of Memory to discuss the findings suggesting that congruent (“fit”, as they called it) music primes more of product-related memory than no music or incongruent music conditions. Such research treated congruence as the catalyst to activate memory. In other cases (e.g. Kellaris et al., 1993), it was found that music congruence supported the reception of a message when the music had the ability to gain attention to it. According to LC4MP, a certain amount of cognitive resources will be allocated to facilitate the retrieval process (Lang, 1995, 2000), which is supported by utilising an episodic buffer to facilitate long-term memory (A. D. Baddeley, 2000; Repovš & Baddeley, 2006). Accordingly, attenuation of cognitive load by congruent music might facilitate the extra load needed for the retrieval process, which provides another possible explanation for the findings of memory being facilitated in previous studies.

Gestalt psychology provides a better explanation for this (see Section 2.2.5.1). Accordingly, the result of the interaction of individual elements is greater than what such elements individually would produce. This is referred to as the “whole” effect (Pomerantz, 1981; Wertheimer, 1938) and here, the effect of *whole* can be of twofold. The first is the effect of the *congruence* itself resulting from the interactions of the individual elements of the music snippets. This is one of the main reasons for considering the congruence aspect of music, deliberately ignoring its other physical characteristics. The second is the overall effect on the cognitive load emerging consequent to the combined effects of the music and the message elements of the advertisement. The result will be that they create an emergent meaning (Macinnis & Park, 1991). Importantly, it will be processed together as a single entity when individual elements are closely related (Pomerantz, 1981). Like the “good” patterns explained by (Garner, 1970), these reasons in combination contributed to attenuating felt cognitive load. However, what is inconclusive in this context is whether these effects allocate more resources to the pool of cognitive resources.

One could alternatively argue that the cognitive load effect was predominantly based on dissonance/psychological-discomfort and subsequently caused the changes in cognitive load, i.e. congruent music reduces dissonance which in turn reduces cognitive load.

Interestingly, the path analysis of the model revealed otherwise. Accordingly, a partial mediating effect was found between music congruence and cognitive load through dissonance (see Table 5-57, p. 184). This suggests that the congruent nature of the music will in fact attenuate cognitive load in addition to its effect through dissonance.

6.3.3 Effect of Complexity on Cognitive Load

The effect of complexity on cognitive load is evident from the support for Hypothesis 2 (see Table 5-15, p. 143). It is clear that the increased number of structures such as attributes and numerical figures included in an advertisement message demand more of cognitive resources to process them. This hypothesis seems to be obvious on the surface of it. However, it is a vital component of the present model given the fact that the perceived cognitive load will fluctuate when the message stimulus is presented with the other stimuli (in this case, the music). Further, it provides important empirical evidence of the way cognitive resources are demanded for multi-structured messages.

The findings are well in line with the learning research in the area of Education Psychology (e.g. Paas et al., 2004; Pollock, Chandler, & Sweller, 2002; Sweller & Chandler, 1994), which suggest that processing of independent information structures impose higher cognitive load on learners (Sweller et al., 1998). Since these structures are temporarily stored and evaluated in the working memory, the working memory capacity was expected to influence the perception of cognitive load. However, surprisingly, the effect of working memory capacity as a covariate on cognitive load was not significant (see Table 5-15, p. 143). There are two possible explanations for this. One is that the working memory capacity of the sample was concentrated around three and four spans. The majority of the sample (63.0%) indicated three to five spans of working memory capacity while only 21.5% and 15.5% indicated less than three and more than five working memory spans respectively. Hence, the sample did not vary much in terms of working memory capacity of the participants. The second possible reason is that the Simple Span Task was administered to measure the working memory capacity instead of the Complex Operation Span Task. Somewhat different results may be observed if the second option were to be administered. However, Need for Cognition appeared to significantly influence cognitive load (see Table 5-15, p. 143).

Since the values were negatively coded, the positive beta value indicated an inverse relationship with cognitive load.

The present findings do not contradict the earlier research in the area of information load in an advertisement message. For instance, they mentioned that the information load undermines purchase intention due to the inability to process (e.g. Chen et al., 2009; Malhotra, 1982). Though such research did not investigate the consumer's actual felt cognitive load, their findings can also be related to the effects of the present cognitive load caused by information structures.

6.3.4 Effect of Psychological Discomfort on Cognitive Load

As mentioned previously, dissonance was conceptualised as psychological discomfort (Elliot & Devine, 1994; Festinger, 1957) and it was hypothesised that the incongruent aspect of music would generate conflicting cognition. The resultant psychological state would then demand more of cognitive resources to resolve itself (Festinger, 1957) from the pool of allocated resources which would otherwise be available to the sub-processes (encoding and storage) related to the message. Thus, it was expected to exert more cognitive load on the listener. This notion is well supported by the present findings (see Table 5-15, p. 143).

These findings provide insights into the previous research findings about advertisements being ineffective due to incongruent music (e.g. Macinnis & Park, 1991; North, Mackenzie, et al., 2004), background music (Park & Young, 1986), or even being worse than not using music at all (e.g. Kellaris et al., 1993; North, Mackenzie, et al., 2004). The reason for such ineffectiveness was commonly attributed to mere distraction. One reason could be that these studies (e.g. Kellaris et al., 1993; North, Mackenzie, et al., 2004; Y. Shen & Chen, 2006) did not investigate the possible reasons for distraction but rather their focus was commonly on direct response in which processing variables were not given any emphasis. Distraction could be generated for many reasons depending on the characteristics of the stimulus under consideration. In this regard, this was mainly due to the congruence aspect of music. The psychological process which was subsequently triggered might have been superficially considered as a distraction in previous research.

However, the current model does not fully capture the dissonance (psychological discomfort) reduction strategy. As mentioned before (see Section 6.3.1), the assumption made in this regard was that consumers are more likely to exercise trivialisation strategies for two reasons. One, dissonance in the present context is more hedonic in nature (Holland et al., 2002; Kelman & Baron, 1974) and therefore, it would be transient. Second, in order to exercise other reduction strategies such as attitude change or addition of consonant elements would require the consumer to be consciously aware of the source of the dissonance, as is commonly associated with the hypocrisy paradigm. Nonetheless, in this context there may be little conscious awareness of the cause of dissonance (as opposed to one's self-threatening condition) other than the consciousness of the existence of a dissonance state itself in his/her mind. Hence, a participant is less likely to engage in other reduction strategies.

6.3.5 Effect of Psychological Discomfort on Attitude

The literature on attitude and dissonance commonly refers to each other due to attitude being one of the most commonly addressed dependent constructs in the area of dissonance research (e.g. Elliot & Devine, 1994 Exp 1; Stone & Cooper, 2001 Exp 2; Wakslak, 2012). However, the emphasis in such research was mainly on attitude change rather than its formation for the reason that attitude change is considered one of the adopted dissonance reduction strategies (Eagly & Chaiken, 1993; Kruglanski & Stroebe, 2005). However, in this research context, the consumers did not have a prior attitude towards the object; hence, only attitude formation was deemed relevant.

The results of the regression analysis confirmed that the psychological discomfort generated through dissonance state caused the attitude towards the advertisement to be unfavourable (see Table 5-16, p. 146). Due to the absence of prior attitude, it is more likely that a person would directly derive attitudes from his/her prevailing psychological state. In other words, he/she would use *affect heuristic* to form attitudes. Therefore, this part of the research supports the idea that consumers tend to use affect-as-information to make judgments (e.g. Albarracín & Kumkale, 2003; Avnet, Pham, & Stephen, 2012; Schwarz & Clore, 1988) especially when they do not have prior information regarding the attitude object to fall back on. This highlights the importance

of managing the affect states generated by the characteristics of the stimuli especially in the case of unfamiliar brands.

The results of the mediation analysis failed to provide evidence of the existence of any form of mediation effects between discomfort and attitude towards advertisement through cognitive load (see Table 5-57, p. 184). This finding confirms that this relationship is direct. Further, the beta values associated with the two causal paths suggest that the attitude towards advertisement is predominantly affected by dissonance, which supports the affect-primacy hypothesis (Zajonc, 1980, 2000).

6.3.6 Effect of Cognitive Load on Attitude towards Advertisement

Apart from dissonance / discomfort being affectively influencing attitude, it is expected that cognitive load also negatively influences attitude towards advertisement. Such behaviour is evident through the support for Hypothesis 6. Thus, it is evident that cognitive capacity acts as a constraint in determining the attitude (e.g. Argyriou & Melewar, 2011; Shiv & Fedorikhin, 1999). When information processing is considered from the *unimodal* perspective (Kruglanski & Thompson, 1999), consumers need to process the information (or *evidence* as they call it) in their judgment formation process and it will be constrained by personal characteristics such as cognitive capacity. However, it should be noted that the present research does *not* argue the existence of a single route in place of the dual process for the reason that this experiment did not manipulate any factors pertaining to such a claim. However, it is apparent that cognitive capacity has a significant effect in forming the attitude towards advertisement.

Additionally, this finding along with the findings on the previous hypothesis (see Section 6.3.5) supports the idea that, with inadequate cognitive resources, consumers tend to misattribute judgment to the affect state due to *inferential error*, mainly because they do not have enough resources to process information. Though it is not exactly the same, this finding is in line with research in the area of the inferential mechanism of attitude formation (e.g. Forgas & Moylan, 1987; Schwarz & Clore, 1988). The current findings are also in line with the other consumer behaviour research that makes a similar claim. For instance, Shiv and Fedorikhin (1999) proved that consumers in restricted cognitive conditions (in this case, high level of cognitive load) rely more on

the affect state than on the cognitive state in the decision making process. In spite of their dependent measure being consumer choice as opposed to attitude, reliance on the affect state in restricted cognitive conditions prevails in their study and in the present one.

Additionally, separate ANCOVAs carried out on both high and low psychological discomfort conditions revealed that mean attitude values associated with moderate and high cognitive load conditions in high discomfort group are less than those of the respective groups in the low discomfort condition (see Appendix 10.3. p. 330). This suggests that psychological discomfort may impose a boundary effect on the effect of cognitive load on attitude. Thus, as mentioned earlier, this is supportive of the *affect primacy* hypothesis (Zajonc, 1980, 2000) that -the affect takes precedence over cognition in attitude formation (e.g. Ajzen, 2001; Edwards, 1990).

6.3.7 Cognitive Resource Pressure

It was expected that cognitive load behaves in a certain manner in response to four experiment conditions. The contention is whether music has the ability to influence the way cognitive resources are utilised directly through the music effect and indirectly through psychological discomfort. This effect is further confirmed by the support for Hypotheses 1, 3 and 4. If stimuli and consequent psychological states influence cognitive resource pressure, the perceived cognitive load between the complex message mixed with congruent music and the simple message mixed with incongruent music should not be statistically significant whereas the differences between other conditions should be different. Hence, a moderate level of cognitive resources is demanded by the aforesaid conditions while a simple message with congruent music and a complex message with incongruent music generate extremely low and extremely high cognitive loads respectively. The support for this hypothesis implies that the music has the ability to influence demand resources to process the message on the one hand and on the other hand it implies that the cognitive load is distributed among the experimental groups as expected (see Table 5-18, p. 147 and Figure 5-4, p.148).

Furthermore, having considered that cognitive load reflects the *pressure* exerted by processing demands and not mere demand for cognitive resources, a low level of

cognitive load implies an abundance of cognitive resources while a high load implies a limited proportion of the remaining cognitive resources. Therefore, in line with the resource-matching hypothesis, moderate cognitive load has generated optimum resource utilisation while low and high load conditions indicate under and over demanding scenarios respectively.

6.3.8 Effect of Cognitive Load on Immediate Memory

One of the primary concerns of this research was to model the way cognitive resource utilisation influences encoding, storage and retention of memory considering the characteristics of two salient stimuli in an advertisement. As mentioned earlier in this chapter, the memory effects will be discussed in the light of the RM Hypothesis (Anand & Sternthal, 1989) and LC4MP (Lang, 2000). The former provides a perspective of utilised vs. excess cognitive resources that will be subsequently used for advertisement-relevant and idiosyncratic processing respectively. The latter, on the other hand, helps to understand the way the advertisement-relevant resources are utilised across sub-processes (see Section 2.5.3).

6.3.8.1 Cognitive Load on Immediate Recall Memory

The findings of this study failed to support the RM Hypothesis. The results indicated a negative linear relationship between total recall memory and cognitive load. In other words, the highest recall memory was reported in *low* and the lowest memory score in *high* cognitive load conditions respectively. Though, the graph (see Figure 5-5, p. 152) indicates a downward sloping straight line, there was no significant difference found between high and moderate as well as low and moderate cognitive load conditions (see Table 5-22, p. 150). This indicates that the effect of the moderate level of cognitive load becomes unimportant in determining memory.

Total recall consists of three parts: category recall, brand recall, and message recall. A separate analysis of these components provided some insights into observed memory behaviour. In advertisement research category recall and brand recall are considered to be the easiest (Kellaris et al., 1993) and hence, no significant differences were found in category recall. However, a significant difference appeared in immediate brand recall

between the low and high levels of cognitive load (see Table 5-31, p. 162). The reason may be that the brand name needs to be distinctively extracted from the advertisement and associated with an existing memory scheme (such as credit cards and/or “online research I took part in”) which needs more effort than is the case with category recall. The other reason is that the brand name being novel, the number of associations that can be created for effective storage is limited. Hence, recall is impaired or improved depending on inadequate or abundant cognitive resources. Similarly, message recall also indicated a significant difference between low and high cognitive load groups.

The present behaviour of memory can be explained in the light of the LC4MP (Lang, 2000). There, *controlled processing* (participant’s objective) is considered one of the important determinants for which sub processes get more resources allocated over the others. In the present study context, it is more likely that the participants tried to *understand* and *remember* the advertisements considering the special experiment environment that they were exposed to. Hence, it can be assumed that each encoding and storage sub process was assigned with an approximately equal level of priority for processing the contents of the advertisement. According to LC4MP, the more thoroughly something is stored, the more readily it can get activated (Lang, 2000). Hence, more resources are available for processing the contents as well as for making a higher number of associations and/or stronger associations in the low cognitive load condition. This will result in the storage process getting sufficient resources allocated and hence enhancing recall.

The significantly different message recall scores across load groups (see Table 5-43, p. 167) can also be explained by looking at the structure of working memory. According to the multi- component model of working memory, there are four main components of it (Repovš & Baddeley, 2006) and how much of each component is being utilised during the process may be reflected in cognitive load. In a radio advertisement context, predominantly utilised components would be the *phonological loop* – that involves keeping traces of acoustic or phonological content, and *episodic buffer* – that integrates long-term memory and other slave systems into a coherent structure (A. D. Baddeley, 2000; Repovš & Baddeley, 2006). It is then clear that when the message contains more information structures, the consumer has to process each of them by constantly refreshing what is already in the memory to make associations. Therefore, he/she has to

utilise an episodic buffer to associate the new coming information (A. D. Baddeley, 2000). When the message contains multiple structures, it may utilise more of an episodic buffer, while the cognitive system will be overloaded if the music becomes incongruent and generates dissonance. The result is therefore low memory, which was originally expected. However, this provides a possible explanation for unexpected high memory in the case of a low cognitive load condition, i.e., the system can now allocate more resources for an episodic buffer, which facilitate the creation of more associations in addition to being supportive of creating new schema related to the advertised brand. Therefore, the *storage* sub process is facilitated and results in superior memory. In other words, the additional resources available in low cognitive conditions might have been utilised to create new memory schemas as opposed to being utilised for processing irrelevant associations. Thus, the RM hypothesis is not fully supported. This is further supported by Working Memory capacity significantly influencing memory (see Table 5-22, p. 150: also note the limitation of distribution mentioned earlier.)

Nonetheless, this notion would contradict the claim of the RM Hypothesis, i.e., excess resources promote idiosyncratic processing that undermines effectiveness. The explanation for this deviation is twofold. One, in order for the consumer to engage in idiosyncratic processing, the advertisement cue should trigger associations related to his/her personal experiences (Anand & Sternthal, 1989) or the message should trigger a set of arguments that will be counter-effective. Hence, it may be that the present experiment context failed to trigger either of the two, i.e., the music used in this study was too unfamiliar to avoid triggering such associations. Second, though the product category is known (credit card), brand name and the other parts of the message were invented for this purpose. This can be supported by Hahn and Hwang (1999) study that shows that the RM Hypothesis is not supported in unfamiliar music conditions. Therefore, it appeared that the excess resources were utilised among the sub processes (i.e. encoding, episodic buffer, and storage) in high involvement situations, which would otherwise be used to process idiosyncratic associations. This would also explain the reason for category recall being insignificant among the groups. With involving mind set, consumers allocate more resources to -sub-processes where message elements such as product category would be easily encoded and stored. As such, a high level of involvement might have provided resistance to unrelated thought interference in this process.

It should also be mentioned that most of the research pertaining to the RM Hypothesis were conducted in laboratory environments where the random effects were minimised (e.g. Keller & Block, 1997; Meyers-Levy & Peracchio, 1995; Y. Shen & Chen, 2006). However, this research was conducted online on a mixed sample. Thus, it is also possible that certain degree of influence of random effects may exist.

6.3.8.2 Cognitive Load on Immediate Recognition Memory

Recognition memory was also found to have a linear relationship with cognitive load as opposed to the expected inverted “U” curve (see Figure 5-6, p. 152). Similar to immediate recall memory, a significant difference was also found between low and high levels of cognitive load (see Table 5-23, p. 151). In contrast with recall memory, a marginally significant difference was found between medium and high levels but not between medium and low levels of cognitive load.

Recognition was a measure of encoding (Lang, 2000) and this finding suggests that encoding is inhibited by a high level of cognitive load. This clearly indicates that consumers fail to extract information from a continuous stream of information in an externally-paced medium due to insufficiency of cognitive resources. When considering the findings on immediate recall memory, this finding is not surprising. In the case of a high cognitive load condition, consumers were cognitively occupied with the psychological discomfort state and tried to encode complex message structures presented to them in an externally-paced medium. This has clearly led to failure in encoding the message contents. However, at the moderate level of load, the complex message was supported by congruent music that enhanced the *encoding* process or the message was simple enough for the resources demanded by discomfort state to affect encoding. This part of the finding is in line with the findings in the literature that demonstrated enhanced message processing with congruent music (e.g. North, Mackenzie, et al., 2004).

The recall process involves a greater demand for processing than the recognition process and associations seem to have little or no effect (J. R. Anderson & Bower, 1972). Hence, it is less likely to use the retrieval process. Further, the Two-process

Theory of recall indicates that recall comprises *search* and *verifying* processes in memory, where the latter is done through recognition (Kintsch, 1970; Wixted, 2007). Therefore, recognition is less resource-consuming than recall and, since recognition requires a relatively lesser threshold, it would be more sensitive than recall (Singh et al., 1988). This will also provide an explanation for the marginally significant difference found between medium and high levels of cognitive load in recognition memory (see Table 5-23, p. 151).

6.3.9 Effect of Cognitive Load on Delayed memory

This section discusses delayed memory behaviour based on several analyses carried out in the previous chapter (see Section 5.6.6). The explanations in this section are also based on the same theoretical grounds as before.

6.3.9.1 Cognitive Load on Delayed Recall Memory

Delayed recall memory resembled the pattern found in immediate recall memory (see Table 5-24, p. 153 and Figure 5-7, p. 156). The difference between immediate memory and delayed memory may reveal how strongly the associations are made so that the retrieval is easily done (J. R. Anderson, 2000; Lang, 2000). Hence, both memory patterns being equal suggest that the conditions prevailing in low cognitive load conditions are more favourable than those in high conditions. In other words, the memory associations created in the first condition become stronger than the second. Support for this claim is found in repeated measures and will be discussed later in this chapter.

It is not surprising that the RM Hypothesis is not supported in delayed recall memory considering that the same hypothesis has not been supported in immediate recall memory. However, both patterns being equal provides some kind of confirmation of the findings in Phase-I. However, two explanations can be offered for such a similar pattern. First, it can be related to the induced level of involvement with the experiment. This might have created strong memory imprints that are less prone to forgetting for reasons such as attentional control and persuasion (e.g. Celsi & Olson, 1988; Greenwald & Leavitt, 1984; Hawkins & Hoch, 1992; Muehling et al., 1990). Second,

this result can be related to the *contextual priming* that may have taken place in Phase-II. The experiment environment was similar in both phases, except for the order of the items listed in the recognition memory test. The recall test was similar to that of immediate memory. Hence, there is reason to believe that the results are somewhat affected by *contextual priming*, i.e., when the participants encounter a similar online experiment environment, it might have activated the context-related memory (e.g. F. Shen & Chen, 2007; Yi, 1990)

Although immediate brand recall significantly differed between low and high levels of cognitive load, the results of the delayed brand recall did not reveal similar results. Instead delayed brand recall was not significantly influenced by cognitive load. This deviation can be traced to the repeated exposure of the treatment advertisement. Since brand name is prominent in an advertisement, repeated exposure will create a strong memory imprint. Further, the association already made with the first exposure is more likely to be reinforced by the immediate recall test and the repeated exposure. Hence, the influence of cognitive load becomes insignificant.

6.3.9.2 Cognitive Load on Delayed Recognition Memory

The results revealed that the delayed recognition memory behaviour in response to cognitive load is similar to what was found in immediate recognition memory except for the marginally significant difference between moderate and high cognitive load becoming insignificant (see Table 5-26, p. 155). This confirms that the encoding that happened during the experiment was strong enough to be retained. Hence, the result may not be entirely attributed to the effects of the manipulated stimuli but may be due to contextual factors, such as high level of involvement with the experiment, as mentioned before. Nonetheless, considering the more sensitive nature of the recognition test compared to the recall test (Krishnan & Chakravarti, 1999; Singh et al., 1988), the recognition test was not expected to deviate drastically from the pattern observed with the immediate recognition memory.

6.3.9.3 *Effect of Cognitive Load on Recall and Recognition Memory Differences*

A measures analysis was repeated to examine the within subject impact of respective memory measures. In the light of the RM Hypothesis, it was posited that the participants who experienced a moderate level of cognitive load would retain the same level of memory while that of the other two extreme conditions would significantly drop. However, these hypotheses (H9c and H9d) were not fully supported.

Only Hypothesis 9c was partially supported. In other words, within-subject recall memory significantly dropped in the high cognitive load condition, as expected. The main reason for such a drop in memory can be attributed to weak associations created in an inadequate resource condition (Lang, 2000). However, the within-subject difference at the moderate level, as expected, was not significant (see Table 5-29, p. 159). Thus, considering only the moderate and the high levels of cognitive loads it can be concluded that the memory association created at the moderate level is relatively strong enough to retain the association after approximately two days. Delayed recall scores in the low cognitive load condition appeared to be higher than those of immediate recall memory for the same reason mentioned earlier regarding repeated exposure of the treatment advertisement (see Table 5-29, p. 159). Therefore, in spite of the existence of a significant difference within subjects, this part of the hypothesis did not appear to have been supported. According to LC4MP, this finding implies that the abundance of resources made the associations stronger with proper *storage* operation that in turn facilitates *retrieval* through activation. This score being higher than immediate recall indicates that the repeated exposure has reinforced the strength of the associations already made with the first exposure.

No evidence was found to claim that cognitive load significantly influences recognition memory differences. As explained in Section 6.3.9.2, the sensitivity of memory may have caused the participants to recognise the contents of the advertisement even after approximately two days. In other words, despite the existence of encoding differences among cognitive load conditions, no evidence was found to support the hypothesis that the level of sensitivity differed through time (subject to the time delay used in this study) across load conditions.

6.3.10 Path Analysis of the Conceptual Model

The conceptual model of the present study captures several processing variables and the results discussed so far were on individual hypothesis of the model. The next section discusses the findings of the full path analysis conducted with Partial Least Squares – Structural Equation Modelling. This has helped evaluate the model from two aspects: a) measurement model evaluation and b) structural model evaluation. The objective of the former is to evaluate the construct and respective indicators while that of the latter is to evaluate the relationship between each latent construct (Hair et al., 2014).

The findings discussed so far in this chapter were further confirmed by the results of the path analysis. The model confirmed that the congruence property of music affects consumers' cognitive load either by generating a dissonance state in the case of incongruent music or by being a part of the “whole”, where message processing is supported. This notion is supported by the partial mediation effect found between music congruence and cognitive load through psychological discomfort (see Table 5-57, p.184). Further, it also supports the part of the model which suggests that attitude towards advertisement is influenced by both affect and the cognitive states generated as a result of the advertisement-stimuli. However, this relationship appeared to be a direct one as no evidence of a mediation effect was found between psychological discomfort and attitude towards advertisement through cognitive load (see Table 5-57). Furthermore, the *affect* route appeared to play a predominant role in determining the attitude over the *Cognitive* route. As mentioned in Section 6.3.5, this finding favours *affective primacy* (Zajonc, 1980) alone as does the other research on that paradigm (e.g. Lai, Hagoort, & Casasanto, 2012; Zajonc, 2000).

Overall, the model indicated a good fit with the proposed conceptual model though the behaviours of certain constructs were not originally conceptualised (see Section 6.3.8). It was also revealed that the present model explains only a small proportion of changes in the advertisement-related memory which is reflected in relatively small R^2 values. As mentioned before in the discussion on memory behaviour, this may be due to the induced high level of involvement with the experiment. However, it should be noted that obtaining memory measures is not as simple and straightforward as other measures

obtained through reflective scales. Hence, the complex nature of these memory constructs may also have contributed to low coefficient values (R^2).

Although the memory constructs were associated with smaller Coefficients of Determination, the construct denoting attitude appeared to be associated with a large coefficient value (see Table 5-55, p. 178). Accordingly, 61% of attitude towards advertisement is explained by the proposed model. Furthermore, the structural model provides useful insights about the way attitude is affected. Additionally, cognitive load is also largely explained by the proposed constructs (music congruence, psychological discomfort, and message complexity) and the hypothesised paths (see Figure 5-13, p. 183).

6.4 GENERAL DISCUSSION OF FINDINGS

This study provides insights into how two salient stimuli in a bundle of advertisement-stimuli affect the consumer's cognitive state and subsequent responses from the cognitive resources utilisation perspective. The following section provides a general discussion of the findings of the study.

The present findings suggest that the lesser the cognitive load is, the better it would be for the consumer. Though “Keep it simple, stupid” heuristic appeared to be valid, the findings suggest that such a claim is more or less a preconception. In other words, it is apparent that the higher level of cognitive load results in inferior memory performance (H8 and H9; see Sections 5.6.5 and 5.6.6). However, message complexity *per se* does not determine the level of cognitive load, but the musical stimuli and the incongruence elicited dissonance state do. Given the limitation, the findings suggest that cognitive load is attenuated by use of congruent music (H3: see Section 5.6.2). From the Gestalt perspective, the elements that are consistent will be processed as a single entity and thus requiring less processing effort (Humphrey, 1924; Pomerantz, 1981). Additionally, congruent music may allocate more cognitive resources to the pool of resources and/or present a chunking / framing effect on the advertisement message (e.g. Hung, 2001; Lavack et al., 2008; Wallace, 1991), which in turn reduces the felt cognitive load. Therefore, the use of correct music in the advertisement enables messages to carry

more informational elements due to the ability of music to attenuate perceived cognitive resource pressure.

On the other hand, the data seemed to suggest that if the music becomes incongruent, it increases the felt cognitive load through an increased level of dissonance, which will subsequently compete for the resources to resolve the generated psychological discomfort (H4: see Section 5.6.2). Hence, rather than allocating resources to process the message, the mind needs to allocate resources to resolve the discomfort state. Thus, an advertisement with even a simple message will impose more cognitive pressure than one with a complex message (H7: see Section 5.6.4). Hence, it would be an oversight for advertisement producers to always strive to use simple messages that may undermine the communication. Instead, they should manage the whole bundle of stimuli in a manner that supports one another. The congruent music appeared to be an effective one in this regard. Accordingly, it supports the claim that congruence is one of the most important aspects in advertisement music to prevent most of its potential pitfalls (Craton & Lantos, 2011).

The findings did not support the RM Hypotheses (H8 and H9: see Sections 5.6.5 and 5.6.6) which predict that the match between demanded and available cognitive resources would elicit superior results (e.g. Anand & Sternthal, 1989, 1990; Keller & Block, 1997; Martin et al., 2005; Y. Shen & Chen, 2006). There can be two main observed differences related to past research and the present study that could justify the deviation. First, those research supporting the RM Hypothesis commonly manipulated the stimuli in three levels, i.e. low, moderate, and high, and found superior results at the moderate level (e.g. Hahn & Hwang, 1999; Keller & Block, 1997). Though the definition of “moderate” in most of these cases remains unclear, it is manipulated by considering the nature of the stimulus alone, but not by considering the impact of such stimuli have on the participants. According to the RM Hypothesis, it should be based on the subject’s cognition rather than entirely on an external stimulus. Therefore, the hypothesis was supported in some situations (e.g. Anand & Sternthal, 1990; Keller & Block, 1997) but not fully supported in other circumstances (e.g. Coulter & Punj, 2004; Hahn & Hwang, 1999).

Second, the research that supported this hypothesis commonly manipulated a single stimulus, such as the tempo of music (e.g. Hahn & Hwang, 1999) or vividness of information (Keller & Block, 1997), and found the effects on a given dependent variable. In other words, they used a direct approach. However, the current research deviated from these two perspectives in a manner that tried to relate an inner cognitive state (cognitive load) of individuals to determine the effects on memory and retention. Further, such demand and utilisation of cognitive resources were attained by manipulating two salient stimuli in an advertisement (music and message) only at two extreme levels – i.e. high vs. low.

Although it is premature to conclude whether the current results can be attributed to the above differences or to the level of involvement that such differences could have contributed to a deviation from the original expectation. It is also possible that the RM Hypothesis is true when the message stimulus remains constant. Similar messages demand relatively equal amounts of resources and a different manipulation of the peripheral cue might affect only the excess resources that would otherwise be utilised for idiosyncratic processing. Even vividness of information in the study by Keller and Block (1997) was manipulated by including vivid illustrations while the message remained unchanged. In the current research, different levels of complexity demanding different amounts of resources to process the central message might cause a deviation from the original predictions. Some support for this can be found in the results of Coulter and Punj (2004)'s research. They manipulated message strength by changing some parts of the message and failed to find support for the Cognitive Resource Allocation Theory.

However, some similarities were observed between the current study and the study of Peracchio and Meyers-Levy (1997) on the way the manipulations were achieved. Accordingly, instead of using a moderate level of stimulus manipulation, they used two levels of advertisement copy (factual vs. narrative) and layouts (integrated vs. separated). Further, they recorded secondary-task reaction time as the measurement of cognitive load. Consequently, they did not find any significant difference in recall measures between the groups. The difference between this and the findings of the current study can again be attributed to two reasons. First, the difference is related to the medium used. They used the print medium, which was self-paced. Participants were

able to refer back to anything that they did not fully comprehend due to the absence of time pressure. The second difference is related to the modality. They used both text and pictures as the stimuli in the advertisements. This might have led to utilising the two different modality-specific resources for processing the advertisement (e.g. Buchweitz et al., 2009; Bushara et al., 1999). This, in combination with the freedom of the self-paced media, may have resulted in insignificant recall scores among the groups. In contrast, the present study used unimodal processing (only audio) in an externally-paced medium and hence, it appeared that the consumers became more sensitive to the cognitive load when these conditions were met.

Recognition memory and recall memory showed a significant difference only between low and high levels of cognitive load (see Section 5.6.5.1), which can be explained in the light of LC4MP (Lang, 2000). As mentioned in earlier sections of this chapter, it is more likely that the participants had given equal priority to controlled processes, i.e., understanding as well as remembering the contents of the advertisements. This assumption is somewhat supported by participants indicating significantly a high level of involvement with the experiment. Accordingly, *encoding* and *storage* sub processes received an allocation of approximately equal resources. Therefore, both recognition and recall memory reported a similar behaviour pattern across the cognitive load groups. Had these priorities been significantly different, recall and recognition memory behaviours would be different from each other as a result of unequal resource allocation among sub-processes. For instance, if understanding got more priority, then the recognition memory could be higher at the moderate level of cognitive load than at the high level, which is not the present finding. Thus, in the case of low cognitive load, more resources are available for encoding and storage sub processes resulting in superior memory. Because recognition memory requires a lower threshold of strength than recall memory (see J. R. Anderson & Bower, 1972; Krishnan & Chakravarti, 1999), there was a marginally significant difference between moderate and high levels of cognitive load. In contrast, inadequacy of resources reflected by high cognitive load and consequent significantly low scores in respective memory. Especially, the number and the strength of the associations created were adversely affected by cognitive load which in turn hinders storage and retrieval (Lang, 2000, 2006).

Results of delayed memory revealed an interesting pattern. Both delayed recall and recognition memory indicated higher scores at the low level of cognitive load and when the level of cognitive load increases, delayed memory scores drop below those of immediate memory. Delayed memory scores being higher than the immediate memory score is not entirely surprising considering the experiment procedure (see Section 4.8.2.5). The participants were exposed to the experiment advertisement for the second time during Phase-I for the purpose of collecting more accurate measures for cognitive and affective responses to that advertisement alone. However, this introduced some degree of biasness to the delayed memory scores in Phase-II. Since the hypotheses tested in this research are independent of the absolute levels of the memory measures, it was not problematic. The pattern that emerged indicates that the memory associations created are stronger at the low level of cognitive load and it becomes weak at the high level. Despite the repeated exposure, both delayed recall and recognition memory being lower than the immediate memory indicated that the strength of memory associations has become weak at the high level of cognitive load. In other words, inadequacy of cognitive resources has left weak memory imprint. However, the within-subject analysis revealed that these differences were significant only in recall memory. This suggests that it is *storage* and not *encoding* that were affected by cognitive load providing further support to the above claim.

Alternatively, the observed insignificant differences may be related to contextual priming and the high level of involvement with the experiment. Since, Stage II of the experiment conducted in a similar online environment (except for the order of the questions), it may have activated the memory related to the previous stage of the experiment. The Encoding Specificity Principle (Tulving & Osler, 1968) also provides some support for the same alternative explanation. Accordingly, the memory traces will get activated easily when the context becomes similar to the one that the memory gets encoded with (Mitchell, Macrae, & Banaji, 2004; Thomson & Tulving, 1970), in this case, the same experiment environment.

The moderate level of cognitive load has become invisible in all four cases of memory measures taken in this research. This suggests that if the cognitive load exerted by an advertisement is low, adding some complexity to the message would not significantly impair memory. However, memory will be adversely affected if it is increased to a high

level. On the other hand, if the already exerted level of cognitive load is high, reducing it to a moderate level will not improve memory significantly, either.

These results imply that the cognitive overload certainly inhibits memory performance regardless of its sub processes while it is improved with a low load condition. These findings are well in line with the findings of information overload research (e.g. Chen et al., 2009; Malhotra, 1982; Sicilia & Ruiz, 2010). Furthermore, the data points to a direction that high and low cognitive loads are the least and the most effective in terms of the effectiveness of the advertisement respectively while the moderate level of it generates slightly differential outputs in terms of *encoding* and *storage*. This suggests that the advertisements should avoid generating high cognitive load though it can vary from low to moderate without impairing its effectiveness much, depending on the differential advertising needs.

This study was not designed to challenge the applicability of Dual Processing Theories. However, the Unimodal Theory appeared to be more applicable for the reason that a part of this study was to investigate the cognitive resource utilisation in attitude formation. Accordingly, the finding is in line with the notion that the *evidence* that leads to the judgment-formation process is affected by the cognitive capacity of the person (Kruglanski & Thompson, 1999). i.e., when the cognitive load is high it hinders the ability to collect *evidence* from the message and thus, the participants will rely on affect heuristic in the judgement-formation process (e.g. Shiv & Fedorikhin, 1999). However, the additional analysis carried out to see whether attitude was strongly affected by the cognitive load route in a low cognitive condition rather than in a high condition did not provide support for information-based judgment formation (see Appendix 10.3, p. 330); but instead the affect route appeared to be stronger.

6.5 RESEARCH IMPLICATIONS AND CONTRIBUTION

There are several theoretical and managerial implications identified in this study and they are discussed in the following sections.

6.5.1 Managerial Implications

This research provided some valuable insights into the influential characteristics of two salient stimuli, music and message, of an advertisement on its effectiveness. Music is considered to be one of the most expensive stimuli in an advertisement due to the large amounts of royalty involved in it (Oakes & North, 2006). Nonetheless, as mentioned before, the type of music used in this study was unfamiliar music and hence the findings would be related to the effectiveness of a much less expensive alternative to popular music.

The congruent property of music defines the choice of musical stimulus as a whole in an advertisement and advertisement producers should be aware that the salient stimuli in an advertisement should be as closely related as possible in order to get consumers to allocate more resources for processing the advertisement message and thereby to increase its effectiveness. Especially when music is congruent, it will attenuate cognitive load that can be utilised to process more of product/brand related information, which would pose an opportunity to communicate better information to achieve specific advertising objectives. For instance, if the objective pertains to comparative advertising, the advertisers have to use comparisons that may involve numbers and claims which constitute more informational structures that will demand more of cognitive resources. However, the proper choice of music enables advertisers to present more of such information without significantly impairing its effectiveness.

Further, advertisers should also be aware of the adverse effects of inappropriate music on the consumer's mind. Especially, if the music used in advertisement is incongruent, it will create a psychological discomfort state and consume cognitive resources that will eventually make even a simply structured message less effective as a complex message. Therefore, they are especially advised to give appropriate attention to the music element and follow an assessment process to ensure the congruence of music.

It was also found that a cognitive discomfort state is more strongly associated with a negative attitude towards the advertisement. It appeared that the attitude towards the advertisement is predominantly determined by the congruent aspect of the music in the advertisement and inappropriate use of such would make consumers dislike the advertisement as a result of experience dissonance. This may even result in a dislike for the brand being advertised and also adversely affect other aspects like purchase intention.

The message of the advertisement should have the minimum required number of informational structures. The more structures it contains, the more cognitive load it generates, thus undermining its effectiveness. Keeping the advertisement message “simple and stupid” is not always practical due to different advertising objectives requiring different messages to be communicated. This, on the other hand, necessitates repeated exposure to make it impactful; hence, increased broadcasting cost. However, the current research findings indicate that the cognitive load generated by complex messages (with multiple informational structures) can be reduced by the use of the music-effect generated by congruent music. Hence, keeping the message simple could be an over simplistic assumption considering that cognitive load is determined not by the message characteristics *per se*, but also by the musical element of the advertisement directly or through other psychological states, such as dissonance. Thus, advertisement producers should be conscious of the possible complementary and disturbing effects such advertisement elements have on the consumer’s mind.

6.5.2 Theoretical Implications

The present study conceptualises an advertisement as a “bundle of stimuli” consisting of multiple elements. Thus, the interaction of these elements, on the one hand, produces emergent meaning and it, on the other hand, would compete for the cognitive resources depending on their characteristics and the resultant psychological states.

Theoretical contribution of this study can be identified mainly in four areas. Firstly, it intends to provide a comprehensive model to describe the effects of the two salient stimuli in a radio advertisement – message and music. Previous literature in the area of

music in advertisement has given emphasis mostly to particular characteristics of music and their direct effects on memory or attitude (e.g. Hahn & Hwang, 1999; Kellaris et al., 1993; North, Mackenzie, et al., 2004), without capturing the “how” aspect while others entirely neglected the most important message stimulus in the advertisement (e.g. Macinnis & Park, 1991; Y. Shen & Chen, 2006). On the other hand, studies pertaining to the characteristics of the message were predominantly on self-paced media (Bradley & Meeds, 2002; Lowrey, 2006) such as print, and did not comprehensively explain the effects of peripheral stimuli. Hence, the current research model provides useful insights into understanding the impact on the consumer’s psychology of the differential properties of these salient stimuli (music and message).

Secondly, this research examined the music congruence and message complexity effects from the cognitive resource utilisation perspective. In spite of failing to find support for optimum resource utilisation leading to superior memory, the overall model helps to understand the way cognitive resources are utilised in the process and the possible outcomes. Importantly this study has identified the most prominent dissonance in the form of psychological discomfort as a result of incongruent music. In other words, when music becomes incongruent with the message, it has the ability to generate an inconsistent state of cognition which is capable of generating a form of dissonance state. Such dissonance generated is mostly characterised by hedonic dissonance. Importantly, the proposed model more accurately captures its subsequent effects on cognitive load and attitude. Its effect is predominantly on the attitude towards the advertisement. This mediating construct is an important contribution because it has the ability to influence both the cognitive and affective base of the consumer. The former is affected by way of competing for the cognitive resources from the allocated resource pool while the latter occurs through psychological discomfort.

Thirdly, the research highlights the importance of adopting cognitive load measurement in further studies of this nature. Though some of the researchers (e.g. North, Mackenzie, et al., 2004) have indirectly referred to cognitive load, they have not measured this construct to observe the behaviours supporting such claims. Some of the other research concerning cognitive load administered a secondary task that would trim the cognitive capacity in a predetermined manner. However, such mechanisms will provide little or no understanding of the actual cognitive load exerted on the

consumers' cognitive system as a result of the advertisement. Furthermore, it can be considered one of the important indicators of cognitive resources utilisation and related responses.

Although, this research does not cover all of the wide and complex nature of the music and the message complexity of a radio advertisement, it tried to capture the holistic nature of music and how well such a stimulus is consistent with the central message from the cognitive resource utilisation perspective. Hence, the model tries to visualise the determinants of the effectiveness of advertisement from a different perspective. Further, the model may be used to explain the cognitive and affective effects of the tightly (or loosely) bundled stimuli of an advertisement in addition to the specific effects generated by the use of music. When the stimuli are loosely bundled, it may generate a psychological discomfort state (a dissonance state) as explained earlier while the tightly coupled stimuli might bring Gestalt effects which will minimise the competition between different stimuli for resources. Both of these would be reflected in the cognitive load condition. Though the relationship between cognitive load and memory was not as originally expected but indicated a small effect size, it can still be used to understand the effects on memory especially from the encoding, storage, and retrieval perspectives, which are in line with the expectations of the LC4MP (Lang, 2000). Accordingly, it is clear that in the case of low cognitive load, consumers have adequate resources to allocate for both encoding and storage while it is significantly impaired in the high load condition. Encoding seems to have some priority over the storage sub-process at a moderate cognitive load where recall becomes significantly affected only at the two extreme cognitive load conditions. Accordingly, the model provides a comprehensive understanding of memory behaviours caused by two salient stimuli. Furthermore, the current research brings the educational psychological viewpoint into advertisement research. Especially considering the verbal message, the manner in which multiple informational structures affect the consumer is an area both researchers and practitioners should be concerned with.

Fourthly, the current research highlights the importance of considering the Working Memory Capacity of individuals in future memory related research. It is important to consider, from an advertising research perspective, the reason why processing of an advertisement is greatly affected by the capacity of the container within which such

processing takes place - in other words, the Working Memory Capacity of individuals. Though, the Need for Cognition appeared to have a significant bearing in some situation, it is not a novel construct in advertisement research. However, its influence on cognitive load is an important aspect to consider in further research for the reason that the capacity of the pool could be influenced by the variations in it.

6.6 LIMITATIONS OF THE RESEARCH

The limitations identified in this study can be classified into four areas and all the interpretations presented in this chapter are subject to these limitations. The first category of limitations concerns the development of the treatment advertisements. One of them was that the experiment did not consider the no-music control condition. Due to this limitation, it appeared that some of the findings cannot be conclusive, for instance, whether congruent music in fact extends the pool of cognitive resources or lessens the relative consumption of such resources, which is already allocated to the pool. Thus, a word of caution was given to the reader about such interpretations made previously in this chapter. The other limitation relates to the musical stimuli. The experiment was not controlled for the structural characteristics of music, except for loudness, and thus may have had some confounding effects on the dependent variables. Though this is a limitation, the experiment let such differences be wrapped around the more overarching concept of perceived congruence in the light of Gestalt theory. Additionally, the complexity of this experiment was manipulated by mainly introducing multiple informational structures into the message (through product attributes and numbers) that led the content of the simple message not to be identical to that of a complex message. Such a limitation also existed in previous research of consumer behaviour investigating the information load aspect (Coulter & Punj, 2004; Geissler et al., 2006; Goodwin & Etgar, 1980; Jacoby et al., 1974; Martin et al., 2005). However, this limitation was taken into consideration in calculating the memory scores to minimise its impact (see Section 4.3.3.1).

The second category of limitations is related to the execution of the experiment. The current research used an online environment to investigate the effects as opposed to a popular physical classroom environment. Though the online environment enabled accessing a mixed sample and achieving some degree of external validity, the

participants may have been exposed to some uncontrolled environmental stimuli. In other words, despite the controlled experimental procedure, the participants took the experiment not in an identical physical environment, thus causing some random interference. The other limitation was the level of involvement. Despite the fact that this experiment intended to maintain a high level of participant involvement with the experiment, it also posed a limitation in such a way that high a level of involvement led to a deviation from the real listening context. Further, it might have been biased towards recalling the brand name and product. Another limitation in this category was obtaining a subjective measurement for cognitive load. Though such a measuring system was proven to be valid and reliable (e.g. Rubio et al., 2004), the cognitive load score would have been more precise had the experiment utilised objective measures such as skin conductance, pupil dilations or heart rate, as opposed to retrospective subjective measures. It should also be noted that the subjective measurement system would enable the measuring of such a complex construct in a more generic setting that would reflect the actual felt cognitive load. Next, though the working memory capacity of consumers was considered as an important covariate in this study, only the Simple Span Task method was administered. However, a more comprehensive understanding of this construct would have been obtained if the Complex Span Task (La Pointe & Engle, 1990) had been adopted. Nonetheless, it should also be noted that had the experiment utilised Complex Span Task, the participants would have faced experimental fatigue, which could adversely affect the other measures.

The third category of limitations constitutes those related to exposure. One limitation in this category was that the experiment considered a maximum of two exposures. Nonetheless, the experience of dissonance and cognitive load may change significantly with the multiple exposures as consumers would normally do and the model does not explain the changes due to such repeated exposures. Furthermore, attitude would be affected by perceptual fluency (e.g. Fang et al., 2007; Winkielman et al., 2003) as well as by the informational effect (see Forgas, 2010) while improving encoding, storage and retrieval. Hence, the findings discussed in this chapter are strictly subject to the limited exposure to the advertisement. The other limitation was that the treatment advertisements were not embedded in a real radio programme and therefore the results may have been different if such a realistic setting had been adopted.

The fact that the experiment used the target advertisement as the first advertisement of the sequel to prevent participants from guessing the middle advertisement bears importance, and let the two other advertisements act as lures for the memory tests. This, on the other hand, posed a limitation in such a way that the target that appeared in the first of a sequence may have had a primacy effect (Murdock, 1962) and might have influenced at least recalling the brand name and the product and some parts of the recognition test.

The last category of limitations is related to the context in which the experiment was conducted. The credit card was chosen as the product for this experiment. Therefore, the consumers may have had a certain level of product involvement and may not have been emotionally attached to the product. Nonetheless, the products that have different emotional attachments and different levels of involvement might generate different results which may have not been taken into account in this experiment condition.

6.7 FUTURE RESEARCH

Considering the findings presented in Chapter 5, directions for future research can be identified mainly in three areas. The first area is on minimising the limitations identified in the previous section of this chapter while the second area is related to the improvements to the model. The third area concerns the alternative theories that can also be considered to explain the effects in future research.

6.7.1 Minimising the Limitations of the Research

It is clear that further research should be conducted to confirm the validity of the model in various contexts of advertisements such as across different product categories. Especially, investigating the effects of the model with low and high involvement products separately would enable assessing the robustness of the model. Furthermore, future research should include no-music controlled condition to distinguish the music effect from that of no music conditions. Such inclusion will also provide important data for explaining cognitive resource allocation and utilisation. Similarly, investigation of the effects in a repeated exposure situation will enhance the understanding of differential effects on memory as well as attitude. Such investigation would serve two

additional purposes of evaluating the proposed model: a) the validity of the model in a real advertisement context where exposure is more likely to be repeated in low involvement conditions, and b) the creation of memory schema with repeated exposure and the effect on memory as well as attitude based on such schema.

The findings of this research did not support the Resource-matching hypothesis. As mentioned earlier, it could be due to the high involvement condition maintained in this experiment. Thus, future research must test the model in a low-involvement condition as well. In other words, it should be tested in a non-attentive manner. Additionally, incorporating a moderate level into manipulation may provide future researchers with more sensitive readings on the mediating constructs.

Musical stimuli are complex in their nature and therefore, it is worth investigating the dynamics of the structural characteristics of music such as tempo, pitch, different melodies, and different textures that affect the model parameters, especially in order to validate its robustness.

6.7.2 Improvements to the Model

Several improvements to the model can be made in future research to enhance the understanding of cognitive resource utilisation in stimulus processing. One such improvement is to include a behavioural construct. For instance, the present model demonstrates both cognitive and affective response and the addition of behavioural response like *purchase-intention* will enhance the understanding of the effectiveness of advertisements. Purchase intention is commonly investigated in the domain of information load (Jacoby et al., 1974; Malhotra, 1982; Sicilia & Ruiz, 2010), but can rarely be found in the music-in-advertisement domain. Further, affective response can also be investigated from other aspects of attitudinal components like attitude towards brand and advertiser.

The current research considered the effects of the two most salient stimuli in a radio advertisement -music and message. However, testing the robustness of the model with multiple stimuli would also help to understand the impact on the mediating construct. For instance, it would be interesting to test the model with multi-stimulus television

advertisements looking at how strongly the music in an advertisement affects the measured constructs in the present model. It will also be interesting to examine the robustness of the model against other kinds of congruence such as picture-message congruence in a TV advertisement.

One of the possible reasons mentioned previously for the RM hypothesis not being supported was the absence of directly related mental schema regarding the advertised brand and the music. This is mainly due to the use of unfamiliar stimuli. Hence, future research should investigate using the familiar stimuli, especially the musical stimulus, to determine the memory results of low cognitive load condition. If such a hypothesis is to be supported, the differential effects of the model on memory based on the familiarity of the stimulus can be determined.

The present model does not capture the controlled processing and automatic processing through orienting response (Lang, 2000; Schneider & Chein, 2003; Shiffrin & Schneider, 1977), but rather the resource utilisation among processes is determined through the resultant measures, i.e., recognition and recall. However, a clearer picture of resource allocation mechanisms can be obtained if the participants' tendency to engage in them is also measured. For instance, in order to measure controlled processing, consumers can be retrospectively examined with the objective of information processing of an advertisement while the latter can be measured by administering objective measures.

Furthermore, incorporating *arousal* as a mediating variable will probably increase the effects explained by the model. Arousal is argued to be affected by dissonance (see Croyle & Cooper, 1983; Kiesler & Pallak, 1976 but see also Elliot & Devine, 1994) and certain types of music are also known to have arousing properties (e.g. Cassidy & MacDonald, 2007; North & Hargreaves, 1999; Smith & Curnow, 1966) that can influence the effectiveness of an advertisement. Additionally, it may influence cognitive load by way of allocating more resources to the pool of available resources for processing the advertisement. Hence, future research in this direction would strengthen the existing model.

6.7.3 Alternative Theory

In order to explain the effect of memory from the cognitive resource utilisation paradigm, two main theories were used in this study. These two theories in combination explain the way the demanded resources are split across major sub-processors (Lang, 2000) and the manner in which the excess resources are utilised (Anand & Sternthal, 1989). However, these theories have not given much attention to the long-term memory structures that would be in place when consumers are exposed to an advertisement. Instead, the emphasis is on processing it in the working memory. However, Mandler (1982) proposed a *schema*-based congruent theory to explain how new information is treated based on relevant information already organised into schemas in the memory. Accordingly, when the new information became moderately incongruent with the existing schema, there would be a positive affect response consequent to arousal (e.g. Aggarwal & McGill, 2007; Meyers-Levy & Tybout, 1989). For this reason, new researchers can also incorporate schema theories in future investigations as an extension to the explanations presented here. This is especially relevant for familiar brands and familiar music conditions as opposed to what was examined in this research. The change of attitude towards an advertisement over multiple exposures can also be explained in the light of this theory.

6.8 CHAPTER SUMMARY

The aim of this research was to investigate the way consumers cognitively and affectively respond to congruent music in advertisements with differentially complex messages. The research also gave special emphasis to cognitive resource utilisation when processing advertisement stimuli together with consequent cognitive states. Therefore, it is conceptualised that while message complexity positively affecting cognitive load, congruent music had the ability to attenuate the felt cognitive load. However, if the music in the advertisement became incongruent, it would generate a dissonance state experienced as psychological discomfort that would eventually consume resources available for processing the advertisement. The receptiveness of the message was subsequently determined by the way cognitive resources were allocated across cognitive sub processors, which was determined by the felt cognitive load. Finally, the attitude towards the advertisement would be affected by both cognitive and

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affective routes to evaluating the advertisement (see Figure 3-1, p. 81). This conceptual model was largely supported. Accordingly, out of the 15 tested hypotheses, nine were fully supported and one was partially supported (see Table 5-30, p. 160 for a summary) providing insights into the characteristics of advertisement stimuli relating to their effectiveness. In addition to providing useful information for advertisement producers, the research also discussed various directions for future research.

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APPENDICES

APPENDICES

Appendix 1	Pretesting
Appendix 2	Message Manipulation
Appendix 3	Waveforms of the Treatment Advertisement
Appendix 4	Experiment Procedure
Appendix 5	Recall Marking Scheme
Appendix 6	Wordlist Used in Working Memory Test
Appendix 7	Endnotes of Experiment
Appendix 8	Human Ethics Approval
Appendix 9	Histograms
Appendix 10	Additional Analysis
Appendix 11	Codes of the Computer Programmes

APPENDIXES 1

APPENDIX 1: PRETESTING

Description of the Appendix –

Full description of the pretesting procedure;

1. Focus group discussion conducted for developing messages
2. Pretest II for selecting stimulus materials
3. Pilot Study for testing the manipulations and verifying the experimental procedure

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APPENDIX 1.1: PRETEST I - FOCUS GROUP DISCUSSIONS

1. Introduction

Focus group interviews allow to get insights about the way consumers response to various areas of advertising (Belch & Belch, 2009) and it can be utilised effectively in preliminary stages of any study (Collis & Hussey, 2003). Further, in this study, complexity is considered as a subjective phenomenon and hence, a discussion of this nature would facilitate obtaining insights about the way such phenomenon is perceived. Therefore, to get a view on complexity in general and on respective manipulations done for this study, a group discussion was held as a part of pretesting.

The main objective of this discussion was to get insights on enhancing messages to meet desired level of complexity. As a secondary objective, it was also intended to improve the scale used to measure the perceived level of complexity.

2. Profile of the Participants

Seven participants from the College of Business and Economics of the University of Canterbury, New Zealand took part in the discussion. All seven participants were Ph.D students belonging to different nationalities. All of them were well versed in English, where four of them considered English to be their primary language of communication. Although two of them were not native English speakers, they stated that they had been living in New Zealand long enough for them to feel it as their first language. In other words, their thought process predominantly happened in English. The composition of the group is summarised in Table A1.1-1.

Table A1.1-1 - Demography of Participant

Area	Remarks
Nationality (Number of participants)	Netherlands (1)*, American (1)*, Sri Lankan (2), Canadian (1)*, South African (1)*, and Iranian (1)
Field	Marketing and Management
Education	Ph.D candidates

* English is considered as the first language

3. Discussion outline

The discussion was held based on five main areas. These areas were chosen in order to probe into the determinants of complexity from the audience's perspective (refer Note A1-1 for the used agenda). Further, the broad topic area and the respective objectives are listed in Table A1.1-2.

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Table A1.1-2 - Discussion Topics and Objectives

Topic Area	Objective
Advertisement complexity in general	To get the participants' idea on what constitutes a complex and a simple advertisement message. This information could be used as a benchmark to understand the way they perceive complexity within the developed messages.
Complexity of written messages	To know how the participants perceive complexity in written messages. These messages were the ones developed for this study. The information gathered could be used to determine whether the characteristics used in respective messages were successful.
Complexity of vocal messages	To find out how the participants would respond to voice messages and to know whether it would be different from the written version of the same.
Suggestions	To get suggestions to improve the complexity / simplicity of messages. This would help to identify the common patterns that may improve both levels of complexity.
Perceived complexity scale	To identify potential issues of understanding and answering the items in the complexity scale. The information of this nature would help to rephrase any word / item that may be ambiguous.
Expectations of a credit card	To find out what participants would expect from a credit card advertisement. This information can be further used to enhance the complexity manipulations of the message.

4. Procedure

An email invitation briefing the purpose of the discussion was sent to nine participants and seven of them replied positively. The discussion was held in the common room of all the Ph.D students of the department. This room was selected as it was quiet with a familiar environment for the participants. Refreshments were provided and participants were given time to socialise with each other before the actual discussion begun. The entire conversation went for one hour and 15 minutes and it was video recorded for analytical purposes.

The discussion moderator (the researcher himself) welcomed everyone to the session and introduced the topic area along with a brief outline of the entire session. The discussion started with a broad topic by asking everyone to recall and mentioned about any advertisement(s) that was (were) perceived as complex as well as simple. As the discussion built up, the moderator probed into the reasons which made the participants consider particular advertisement they mentioned to be either complex or simple. In order to get such points clearly surfaced, the moderator summarised the on-going discussion time to time and presented back to the group for further ideas / comments.

The next stage of the discussion was to get the participants' ideas about the complexity level of the manipulated messages. This was done in two stages. In the first stage, six messages were distributed in print form among each participant and were asked to circle either "complex" or "simple" words appeared under each message (see Note A1.1-2). A round of discussion was then carried out to uncover specific characteristics of each message, which led

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to their decision. In the second stage, voiceovers of the same messages were played in a different order than it appeared in the print form. The participants were again asked to rate the level of complexity on a five-item seven-point scale provided to them on a separate sheet of paper (see Note A1.1-3). The message number had also been included in the voiceover to make it easy for participants to match the message with respective scale. Subsequently, a round of discussion was initiated to get the perception of each participant on vocal messages compared to the printed version of the same.

Due to the fact that all participants had experienced both versions of messages, they were encouraged to provide any suggestion to improve the complexity manipulation. This part of the discussion was held as the participants were considered to be experts (Spake, Beatty, Brockman, & Crutchfield, 2003) in research process. The fourth stage of the discussion was on the scale used to measure the complexity. For this, experience of any ambiguity / problem each participant had with each item on the scale was obtained. Finally, participants were asked to explain their expectations from a credit card advertisement.

5. Coding

Coding was done by listening to the video recording. The approach was adopted to find initially the commonalities in perceiving complexity in an advertisement message and to look for similar patterns in succeeding sections of the discussion. Firstly, specific phrases were identified that was used to explain why an advertisement message would be perceived as complex or simple. Then, these phrases were coded with characteristics of a message that would be strongly associated with complexity / simplicity.

6. Findings

There were six such characteristics surfaced with the initial discussion on complexity of an advertisement in general². They are listed in Table A1.1-3.

On the whole, the complexity manipulations were successful with most of the messages except for the M2 (see Table A1.1-4). Since the number of responses is few, it is difficult to carry out any statistical test to arrive at conclusions. However, having taken this constrain into consideration responses for the messages are presented in Table A1.1-4. In this regard, median is considered instead of mean as it is prudent, statistically, to consider ranks in case of low number of responses (Conover & Iman, 1981).

² Here *general* is referred to any advertisement message that participants could recall of and not the messages developed specifically for this study.

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Table A1.1-3 - Characteristics of a Simple/Complex Message

Characteristic	Complex	Simple
1 Indirect vs direct	Indirect	Direct
2 Attributes communicated	Multiple	Single
3 Level of organisation	Less organised	More organised
4 Generic vs specific message	Specific	Generic
5 Level of engagement	Less engaging	Engaging
6 Familiarity	Less familiar	Familiar

For the printed messages, participants were asked to choose one from either complex or simple, while for the vocal messages, a five-item scale was used. Thus, for this analysis, it is considered the mid-point on the scale as the benchmark of the categorisation. Any score $Mdn < 4.0$ is considered as simple and $Mdn \geq 4.0$ is considered as complex, where Mdn is the median score of each message.

Table A1.1-4 - Intended Manipulation vs Perceived Manipulation

Message	Print Complexity (1 = Simple: 2 = Complex)	Vocal Complexity (1 = very low: 7 = very high)	Overall Perceived Manipulation	Expected Manipulation
M1	1	2.4	Simple	Simple
M2	2	2.0	Ambiguous	Simple
M3	2	6.6	Complex	Complex
M4	1	1.8	Simple	Simple
M5	2	6.6	Complex	Complex
M6	2	4.6	Complex	Complex

Median score is considered for each message

In the discussion it was surfaced that the vocal version of the message had been perceived to be simpler than its counterpart. One of the reasons for such a perception was that the voice messages allow participants to capture the point it tried to convey easily than the print version. More specifically, when the messages was read from a paper, the numbers and the comparisons forced them to pay more attention to details while the comparison was done without giving such attention to specific numbers in the voice messages. Another factor was that the voice messages drew more attention making it easy to process. The way the message was narrated (pausing) had also helped them to understand it easily. It also appeared, for some, that the print version of the message was better than the vocal version. One main reason mentioned was that the former allowed them to reread it when it was difficult to understand, while the latter did not. The other proposition was that those who have been living in English speaking environments found it easy with speech than text. Thus, it was difficult to determine what factors were predominant and whether there was a significant difference between the ways that each would be comprehended.

Since there was no consensus among the participants in this regard, the need aroused to determine whether there was any complete shift in the way the complexity was perceived. To

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check this Wilcoxon Matched-Paired Signed-Rank Test was carried out (see Table A1.1-5). This test is a non-parametric test and considered to be more suitable with low number of observations presented in current situation.

Table A1.1-5 - Rank Test of Vocal vs Print Messages

Median of Simple Messages* (sm)	Median of Complex Messages* (cm)	Median Difference* (cm-sm)	Rank
2.50	3.90	1.40	+2
2.80	3.20	0.40	+1
3.40	6.50	3.10	+5
1.70	6.60	4.90	+7
2.20	6.70	4.50	+6
2.30	4.40	2.10	+4
2.70	4.20	1.50	+3
Sum of signed ranks			+28
Z value [#]			-2.366
Asymp. Sig. (2-tailed) [#]			0.01

* for each respondent

Wilcoxon Signed-Rank Test

Accordingly null hypothesis (H0: medians of the perceived complex and simplicity are same for the vocal messages by each individual) is rejected and thus, the alternative hypothesis was accepted ($Z = -2.366$, $p = .01$). In other words, the messages that had been perceived as complex in print form were considered the same in audio form and vice-versa. Thus, it could be said that in spite of different viewpoints emerged in the discussion as to the way complexity could be different in two types of messages, there appeared to have no crossovers.

When participants were asked to give their ideas to improve the level of complexity manipulations in the given messages, the ideas emerged were consistent with what appeared in earlier discussion (see Table A1.1-3). Among them, *Organisation* of a message was not originally considered at the time of developing these six messages. The same characteristic was mentioned again under the improvements for the simpler messages as well. The other characteristics suggested, however, were already reflected in the messages.

The final stage of the discussion was on the expectations from the credit card advertisement regardless of the channel being utilised. Participants mentioned that characteristics like availability, ease of use, and acceptance were what they would mainly consider. It was also mentioned that one sided message would be more preferable to two sided messages.

Changes

Except for verifying the complexity manipulation and obtaining insights into the notion of complexity, some changes were also made to both messages and the scale to measure the level of complexity. The wordings in the messages appeared to be less direct and hence it was

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decided to modify some words to make them straightforward. For instance in M4: “want” instead of “expect” and “cheapest” instead of “best”; in M1: “cheapest” instead of “best” were modified.

The scale used to measure the perceived level of complexity was considered somewhat ambiguous with the current scaling mechanism. Presently it is scaled 0 = Very Low and 7 = Very High and the items had been phrased to match the scale. However, it appeared that this would lead to some confusion especially with the reversed item. Thus, it was suggested to use *agreement-scales* instead. Consequently, the wordings of items were also changed to suite the new scale descriptor. Additionally, certain key words of some items were also changed to improve its ability to capture the construct and reduce the ambiguity. For instance, “depth” of information was replaced with the word “complex” and “simplicity” was replaced by “little amount of information.” The modified scale is presented in Table A1.1-6.

Table A1.1-6 - Modified Message Complexity Scale

#	Item (0 = strongly disagree ; 7 = strongly agree)
1	The message was <i>difficult</i> to understand
2	The contents of the message was <i>complex</i>
3	The message had <i>little amount</i> of information
4	I had to put a lot of <i>effort to understand</i> the message
5	I had to <i>keep track of many things</i> in my mind to understand this message

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NOTE A1.1-1 – AGENDA

Area: Complexity of advertisement messages

Participants: Six PhD students from the Department of Management

Discussion outline

1. Welcoming participants.
2. The purpose of the study.
3. Ask the group about ads they can remember with difficult messages and the reason that they think it's difficult.
4. Ask the group about ads they can remember with simple messages and the reason that they think it's simple.
5. Provide a sheet of paper with advertisement messages and asked the group to classify them as simple or complex. Have a round of discussion on the reasons for their decision.
6. Make them listen audio clips and then ask to rate for complexity.
7. Get suggestions for improvements.
8. Ask the group to explain about their experience on the complexity measurement scale used in step 6.
9. Receive ideas about their expectations of a credit card advertisement
10. Thanking for participation.

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NOTE A1.1-2 – DISTRIBUTED MESSAGE SHEET

(1) M1

We, at M-BANK, know we can offer the best credit card. Why? Because our annual interest rates are the lowest in New Zealand. M-BANK doesn't have hidden rates like other banks do. To find out more reasons to join us, step into any branch or visit our website. M-BANK

Simple / Complex

(2) M2

We M-BANK, offer you the best credit card you have ever been searching for. With M-BANK's best reward system, you can spend more every month to save more at the end. To find out further, step into any M-BANK branch or visit our website today.

Simple / Complex

(3) M3

Which APR do you want your credit card to charge? 12.5% or just 9.5% per annum? How many reward points do you want for a dollar spent? Just 1 or 2.5 points? Yes. We at M-BANK offer them, and many more, to make your credit card the best in New Zealand. Call or visit any M-BANK branch today to get yours. M-BANK

Simple / Complex

(4) M4

What do you expect from your credit card? Surely, you need it to be cheap and rewarding. At M-BANK, we understand that and that's why we offer you the best credit card you can get in New Zealand. Call M-BANK hotline or visit any branch today to get yours. M-BANK

Simple / Complex

(5) M5

We, at M-BANK, know we can offer you the best credit card. Firstly, standard APR in New Zealand is 12.5% to 20% per annum, but M-BANK's is just 9.5%. 2nd, you can choose a payment plan that is either 1.8% of the owing balance or 4 dollars per month. 3rd if you need to get a cash advance, our rate is no higher than the normal APR. To find out more, step into any branch or visit our website. M-BANK

Simple / Complex

(6) M6

We M-BANK, offer you the best credit card. You can enjoy spending with M-BANK's 65-day long credit period, just 9.5% APR, and 2.5 reward points for every dollar spent. If you spend more with us, you save more at the end. To find out further, step into any M-BANK branch or visit our website today.

Simple / Complex

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NOTE A1.1-3 - COMMON IDEAS ABOUT THE COMPLEXITY OF MESSAGES

Message	Why Simple	Why Complex
M1	Few lines Involves reader Talks about one thing	More words No focus
M2	Funny argument	Boring Contradicting (eg. Spend more to save more) Not giving enough information
M3		Too many numbers and topics Acronyms Too many questions asked Explanations about banking system Comparative information Technical
M4	Asking engaging question Talks about one thing With simple question	Not logically build
M5		Numbers Number of attributes Comparative information Too many lines Much like the number 3 (M3)
M6	Can get the information looking for Simple; three things in a row	Percentages and numbers Acronyms Too many things

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NOTE A1.1-4 – QUESTIONNAIRE TO EVALUATE MESSAGES

Please rate the vocal messages referring to the following scale.

Very Low	Low	Somewhat Low	Neither Low / High	Somewhat High	High	Very High
1	2	3	4	5	6	7

Message 01

	1	2	3	4	5	6	7
The level of <i>difficulty</i> to understand this message is							
The <i>depth</i> of information in this message is							
The <i>simplicity</i> of this message in general is							
The <i>effort</i> I put to understand this message is							
Various <i>things I had to keep track of</i> in my mind to understand this message is							

Message 02

	1	2	3	4	5	6	7
The level of <i>difficulty</i> to understand this message is							
The <i>depth</i> of information in this message is							
The <i>simplicity</i> of this message in general is							
The <i>effort</i> I put to understand this message is							
Various <i>things I had to keep track of</i> in my mind to understand this message is							

Message 03

	1	2	3	4	5	6	7
The level of <i>difficulty</i> to understand this message is							
The <i>depth</i> of information in this message is							
The <i>simplicity</i> of this message in general is							
The <i>effort</i> I put to understand this message is							
Various <i>things I had to keep track of</i> in my mind to understand this message is							

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Message 04

	1	2	3	4	5	6	7
The level of <i>difficulty</i> to understand this message is							
The <i>depth</i> of information in this message is							
The <i>simplicity</i> of this message in general is							
The <i>effort</i> I put to understand this message is							
Various <i>things I had to keep track of</i> in my mind to understand this message is							

Message 05

	1	2	3	4	5	6	7
The level of <i>difficulty</i> to understand this message is							
The <i>depth</i> of information in this message is							
The <i>simplicity</i> of this message in general is							
The <i>effort</i> I put to understand this message is							
Various <i>things I had to keep track of</i> in my mind to understand this message is							

Message 06

	1	2	3	4	5	6	7
The level of <i>difficulty</i> to understand this message is							
The <i>depth</i> of information in this message is							
The <i>simplicity</i> of this message in general is							
The <i>effort</i> I put to understand this message is							
Various <i>things I had to keep track of</i> in my mind to understand this message is							

APPENDIX 1.2: PRETEST II: STIMULUS TESTING

1. Introduction

Sequential to the pretest testing the complexity levels of a set of messages, this test was intended to measure the level of complexity of four selected messages from the previous study, and to test the suitability of four selected music snippets for a credit card advertisement.

2. Objectives

The main objectives of this study had been twofold. The first was to measure the level of perceived complexity of four selected messages and to select the message set (Simple and Complex) that would reflect the largest mean difference. Second objective was to select two music snippets that would be perceived as most congruent and incongruent with a credit card advertisement. Since the message set had not been selected, the music congruence was measured with generic product category (credit card) instead of measuring it with the actual message set. Accordingly, three distinctive measures were taken, out of which two were related to music. Table A1.2-1 summarises these measurements.

Table A1.2-1 - Description of Variables Measured

Code	Variable	Type	Instrument
PV1	Perceived message complexity	Quantitative	Five item semantically differential scale
PV2	Appropriateness of music	Quantitative	Single item semantically differential scale
PV3	Familiarity of music	Quantitative	Single item bipolar scale

3. Sample

Sample of this study was undergraduate students from the Faculty of Business and Law. Students were invited through emails to participate voluntarily in this pretest. Accordingly, approximately 95 students were contacted initially, out of which 37 had attempted and only 24 had completed the study.

4. Material

Out of the six messages tested in the previous study, two complex and two simple messages were selected for this test. All four messages were presented in audio form and no text was shown during the exposure. Duration of audio recording varied from 20-30 seconds each. Following to this was the evaluation of four music snippets for their perceived congruence. These music snippets belonged to four different music genres that were believed to be congruent and incongruent with a credit card. Duration of each music snippet was approximately 20 seconds. The Table A1.2-2 outlines the materials utilised in this study.

Table A1.2-2- Description of Materials Tested

Material	Indented Output	Remark
<i>Message</i>		
Mg1	Simple	Pair_1 (Mg1 and Mg2 is a pair)
Mg2	Complex	
Mg3	Simple	Pair_2 (Mg3 and Mg4 is a pair)
Mg4	Complex	
<i>Music</i>		
Mu1	Appropriate	Drift in Time by Brian Thomas Curtin (Genre: Ambient / New Age)
Mu2	Appropriate	To Stay or Go by Josh Smith (Genre: Funk/Soul)
Mu3	Inappropriate	Second Chance by Stephen Rice (Genre: Hard / Pop)
Mu4	Inappropriate	So What by Jose Pasquini (Genre: Metal)

5. Procedure

The pretest was developed and deployed in Qualtrics (www.qualtrics.com) and the participants were sent the link through an email. Instructions were given at the beginning of the test. Further, they were asked to take the test in a non-interruptive environment and to use headsets to reduce the background disturbances. In order to ensure proper operations of the sound software plug-in, a test sound clip was inserted and participants were asked to make sure the sound was properly played and the volume was adjusted to a comfortable level. Additionally, this was also used to orient them for the rest of the test.

The survey had two main blocks. The first blocked contained four audio messages without any background music and the second had four music snippets. The run time for each was approximately 20 seconds. In order to counterbalance the serial position effect, both music and messages were randomised within their own block and the order of presentation was recorded for later use.

Each message was tested on the level of perceived complexity. For this purpose, a five item perceived message complexity scale was used (see Note A1.2-2). A message was randomly presented and the participants were required to listen to it before advancing to the next page, which contained five-item scale to measure the complexity. The second block contained four music snippets and two items to measure the level of congruence of the corresponding music with a credit card advertisement as well as familiarity of music respectively. The musical congruence was tested by asking participants to mark the level of appropriateness on the question “How far do you think this music is appropriate for a credit card advertisement?” Four-item music message congruence scale used in the main study was not used for the same reason that the music was tested without integrating it with a message. Hence, the scale items became not appropriate for this phase of pretesting. Finally, the level of familiarity of music

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snippets was measured by asking “This music is...(Very familiar to me/ Very unfamiliar to me).”

6. Analysis

The multi item scale used in the message section was tested for the internal consistency. The initial Cronbach’s alpha values were satisfactory only with message 2 ($\alpha = 0.789$) and message 4 ($\alpha = 0.772$), while it was not so with the other two messages ($\alpha = 0.620$ and $\alpha = 0.676$). Further into the result revealed that item CSI3 of complexity scale had relatively low or negative correlations (0.069, 0.017, 0.101, -0.325 for respective message contexts) with other scale-items. This was true in all four message situations and could achieve higher reliability if the item was to be deleted. Hence, it was removed from further analysis. This item was reversed in the scale and it may be that participants had some confusing thoughts about the exact meaning of it. The Table A1.2-3 shows the results of reliability tests.

Table A1.2-3 - Reliability Scores of Multi-item Scales

Message Context	Complexity Scale	
	Before	After
1	0.620	0.765
2	0.789	0.879
3	0.676	0.811
4	0.772	0.914

Due to the fact that the sample size of this pretest is low ($n=22$), Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy test, had also been conducted to test whether the data set was factor-analysis worthy. Based on past experience of researchers, it is considered that index of factorial simplicity of KMO test should be above 0.50 to be acceptable (Kaiser & Rice, 1974). The analysis of this dataset revealed that IFS of KMO stays above 0.6 in each case of message complexity and musical arousal, making them acceptable for factor analysis.

Table A1.2-4 - Summary of Factor Loadings

Message	Factor loading of items*				Eigen Value	% of Variance
	CSI1	CSI2	CSI4	CSI5		
1	0.820	0.390	0.913	0.884	2.440	61
2	0.914	0.907	0.788	0.839	2.984	74
3	0.679	0.764	0.859	0.891	2.578	64
4	0.840	0.840	0.727	0.789	3.195	80

* Items of *Message Complexity Subjective Indicator*. The item 3 is removed due to low communality value.

Due to the small sample size, *Friedman* nonparametric test of *two way analysis of variance by ranks* was conducted on both situations (i.e., message and music) to test for the differences

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among the groups. The results were highly significant ($p_{Pair1} = .00$; $p_{Pair2} = .00$) and to determine the significant levels in different combinations of these groups, *Wilcoxon Singed Rank Test* was performed as post-hoc testing. The results with the significant values are presented in Table A1.2-6 and Table A1.2-7.

Table A1.2-5 - Wilcoxon Singed Rank Test Results for Message Complexity Manipulation

Message Pair	Mdn Rank	Mdn Dif.	Z Value	Sig
Pair 1	12.26	0.88	-3.24	.00
Pair 2	13.88	1.50	-2.98	.00

Table A1.2-6 - Wilcoxon Singed Rank Test Results for Music Congruence

Music	Mu1	Mu2	Mu3	Summary
Mu1 [#]				M = 2.76 Mdn = 2.00
Mu2 [#]	Z = -1.52 p = 0.13			M = 3.44 Mdn = 3.00
Mu3 ⁺	Z = -1.42 p = 0.16	Z = -0.41 p = 0.68		M = 3.33 Mdn = 3.00
Mu4 ⁺	Z = -1.00 p = 0.31	Z = -2.68 p = 0.00	Z = -2.26 p = 0.02	M = 2.35 Mdn = 2.00

Expected to be appropriate music

+ Expected to be inappropriate music

Table A1.2-7 - Wilcoxon Singed Rank Test Results for Familiarity of Music

Music	Median	Sig.
Mu1	2.00	.00
Mu2	3.00	.02
Mu3	3.00	.03
Mu4	2.00	.00

Familiarity of the music was determined by One-Sample Wilcoxon Singed Rank test. The threshold of the median to test the hypotheses was set to 4 (since the scaled anchored 1 to 7) for all four music snippets. Accordingly, significant differences were observed in all four cases between the median and the set value (see Table A1.2-7).

7. Results

There were two pairs of messages tested with two simple messages (Mg1 and Mg3) and two complex messages (Mg2 and Mg4) in each pair. As expected, the results showed significant differences in the perceived complexity levels. In other words, it can safely be told that difference between the simple and complex messages are perceived as expected in both message pairs. This is also a confirmation to the previous focus group results. However, the Pair_2 ($\Delta Mdn = 1.50$) showed higher significant mean difference than the Pair_1 ($\Delta Mdn = 0.88$). Thus, Pair_2 appeared to be a better candidate for the main experiment.

There were four music snippets from four genres chosen for this study, which were believed to be appropriate and inappropriate for a credit card advertisement. Considering the mean scores, it appeared that the music was mostly perceived to be inappropriate if not natural. However, it should be noted that these music were tested without mixing with vocal messages and the personal preference for the music is believed to create biasness towards rating. Hence, these results were regarded to obtain a direction towards which music would be more suitable for mixing with vocal messages for further verifications.

Accordingly, highest level of appropriateness was recorded with Mu1 ($M = 3.44$, $SD = 0.92$), while the lowest was recorded with Mu4 ($M = 2.35$, $SD = 1.09$). Notwithstanding the fact that these music snippets were intended to be high (Mu1 and Mu2) and low (Mu3 and Mu4) on appropriateness with a credit card advertisement, all possible six combinations were tested for differences (see Table A1.2-6). The results revealed that there was a significant difference between two groups of music. The first group with Mu2 and Mu4 ($Z = -2.678$, $p = .00$) appeared to be statistically significant. However, the second group with Mu3 and Mu4 was also unexpectedly significant ($Z = -2.263$, $p = 0.02$), mean difference was not as prominent as it was with the other set. The other two groups (Mu1 and Mu4; Mu2 and Mu3), which were expected to have significant difference, did not appear to be so. Due to the group1 and 2 being significant, the group 4 was not significant ($Z = -0.413$, $p = 0.68$) as it comprised of Mu2 and Mu3. Additionally, the familiarity test of music revealed that all four music snippets were significantly unfamiliar. These results were however expected for the reason that the popular music was eliminated initially from the considered set.

8. Summary

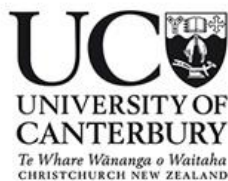
The present study was conducted to select suitable manipulations for the main experiment. For this, four vocal messages in two complexity categories and four different types of music snippets were used. The study was conducted online for a chosen group of 24 undergraduate students. Accordingly, they were asked to report the level of perceived complexity on each vocal message and the level of appropriateness of each music snippet for a credit card advertisement. The findings revealed that the intended manipulations were met with both vocal messages and music. Accordingly Pair_2 was selected as the message set; and Mu2 and Mu4 were selected as the congruent and incongruent music respectively. However, there were some concerns associated with the selection of music for the reason that the congruent music was not standing out as expected. It was assumed that the relative low scores were due

APPENDIXES 1.2

to testing the music for congruence without mixing them with the actual message. Thus, it was decided to further confirm the level of congruence in successive pilot test after mixing the chosen messages with respective music snippets. On the whole, the study objectives were achieved to a greater extent.

NOTES A1.2-1: - SCREEN SHOTS OF THE PRETEST

1. Introduction to the Pretest



Hi

The main purpose of this study is to find out how you would perceive an audio parts of a radio advertisement. For this you will be asked to listen to four audio messages and four music snippets, and answer few questions at the end of each. The full study will take less than 15 minutes to complete.

Reward

You will have a chance of **wining a \$50 gift voucher** for your participation.

Special Instructions

1. Make sure you have a **headset attached** to your computer and set the volume to a comfortable level.
2. Please do not engage in any other activity during the test.
3. Please stay in a non-disruptive environment, while taking the test.

Findings of this study will be used for a designing part of another experiment. We are glad to tell you that you are one of those very few people who are invited to participate in this study. The information you provide would be extremely useful for us in the successive designing stages of our study.

This study is confidential and information you provide will only be used for this research purpose. Further, you have the right to withdraw from this study at any time, including withdrawal of any information provided without any penalty.

The study is being carried out as a partial requirement for PhD by Leelanga Seneviratne (TP: +64221260440, email: bls50@uclive.ac.nz) under the supervision of Associate Professor Ekant Veer (email: ekant.veer@canterbury.ac.nz). They will be pleased to discuss any concerns you may have about participation in the study.


We are extremely thankful in advance for your participation.

0% 100%

>>

APPENDIXES 1.2


2. Test audio



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This is a testing audio. Please check your audio device and adjust the volume to a comfortable level. Once you are ready to take the test. Please hit the next button.

Note: each audio in the test will last for 25-30 seconds. The progress bar of the audio player may not advance with the time.



☐ Yes. I am ready to start the test

0%

100%

>>

3. Audio message



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Please hit the play button and listen to the message only once.
(The ad will start in a few seconds.)



☐ I've finished listening to the message


0%

100%

>>

APPENDIXES 1.2

4. Perceived complexity of the played audio message



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Considering the just heard advertisement message, please indicate your level of agreement with the following statements.

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
It was <u>difficult</u> to understand	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The content was <u>complex</u>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It had <u>little</u> information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I had to put an <u>effort</u> to understand it	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I had to <u>keep track</u> of many things in my mind to understand it	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>


0%

100%

>>

5. Screens similar to 3 and 4 were displayed four times for each message.

6. Introduction to music section



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Music session

During this session, you will be asked to listen to four music snippets, which run for approximately 20 seconds each. Please listen to them carefully and answer the questions appear below. This time, you can listen each as many times you want.

Please hit next button to continue.


0%

100%

>>


APPENDIXES 1.2

7. Music evaluation



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Please hit the play button and listen to the music snippet.




	Very Inappropriate	Inappropriate	Somewhat Inappropriate	Somewhat Appropriate	Appropriate	Very Appropriate
How far do you think this MUSIC is appropriate for a CREDIT CARD advertisement.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

This MUSIC is


Very familiar to me ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very unfamiliar to me

0%  100%




8. Screen similar to 7 was displayed four times for each music snippet.


9. Thanking note



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We thank you once again for your participation. The information you provided will only be used for the purposes of this study.
Have a good day!

0%  100%



APPENDIX 1.3: PILOT STUDY

1. Introduction

Prior to the main data collection phase, it was decided to conduct a pilot study for three main objectives. First, the pilot study was undertaken to ensure proper flow of the experiment procedure including proper a) assigning of participants to the experimental groups, b) the detection and presenting of target advertisement properly for the second time, c) proper operation of working memory tests, and d) understanding of the instructions and the questions of the experiment without major drawbacks. Second, it was also used to check for the effectiveness of manipulation on the final form of the experiment-ads. Third, the data of this phase was used to determine the proper functionality of the computer programs written to calculate recognition memory score and working memory capacity.

2. Sample

The sample consisted of students from the University of Canterbury and they were invited to participate in the study by sending an email containing the link. Accordingly, 354 email invitations were sent. Twelve participants per group were considered an appropriate sample size for a pilot study with two or more groups (Johanson & Brooks, 2010; Julious, 2005). Thus, 24 participants were expected to take part in this phase of the study. However, a total of 58 participated out of which 21 exercised the right to withdraw from the study for unknown reasons, while remaining 37 completed it. Thirty two out of these participants returned for the stage II, which indicated 100% completion rate. The Table A1.3-1 shows the stages at which the participants withdrawn from the study.

Table A1.3-1 - Withdrawn Statistics

Stage of the Study	Withdrawal %
<i>Stage I</i>	
Introduction	33%
Instructions	24%
Listening to the ads	10%
Memory tests	24%
Cognitive measurements	5%
Working memory capacity	5%
Demographic data	0%
	100%
<i>Stage II</i>	
Introduction	0%
Memory test	0%

APPENDIXES 1.3

The sample consisted of 54.1% of males and 40.5% females ($M_{age} = 22.75$), while 2.7% chose “Prefer not to answer” option. The majority of the sample (84%) belonged to the age group 18-26 mainly due to the reason that it was drawn from undergraduate student population of the University of Canterbury. To understand music preference of the sample, participants was asked to choose three genres they prefer most out of 15 listed options. Accordingly, Pop music was the most preferred music genre (54%) while Blues being the least preferred (3%).

3. Procedure

The procedure adopted for the pilot study was similar to that of the main study for detecting any pitfalls in the procedure. Thus, the experiment was conducted online and the link was sent to the participants via emails. A description of the experiment was provided and the participants’ consent was obtained at the beginning of the study. Next, the instructions for the experiment were given to use a head set and not to engage in any other activity during the experiment. Then was a test audio clip containing sound of ocean waves mainly for allowing participants to check for the proper functionality of the web audio plug-in and to adjust the value to a comfortable level. One of the controls introduced for this experiment was to keep the involvement with the experiment at a high level and to achieve this, the participants were notified that the advertisements they were about to listen to had been highly regarded by academics and practitioners. Subsequently, the participants were randomly assigned to one of the four experiment groups and three advertisements, including the treatment advertisement, were played. The advertisements audio ran for about one minute and twenty seconds including an interval of approximately one second and 50 milliseconds between each advertisement. This was followed by the recall memory test, in which participants were asked to recall category, brand, and parts of the advertisement message. After the recall test was the recognition test. In this, 22 test items were presented and participants were asked to state whether they heard each item in one of the advertisements in the study. Then the target advertisement was played once again to measure the levels of Psychological Discomfort, Cognitive Load, and Attitude towards Advertisement with regard to the target advertisement. The section following this was related to the covariates of the study. Accordingly, the level of Need for Cognition was measured before conducting the Working Memory Test to measure each participant’s working memory capacity. Finally, demographic information of the participants including their preference for music was obtained.

The invitations for the Stage-II were sent to the email address provided by the participants at the end of Stage-I after approximately 48 hours. An introduction about the stage II was provided followed by the two memory tests, recall and recognition. The same memory test was carried out for the purpose of comparing the two stages. However, in order to prevent the order of the items activating the memory traces of Stage-I, only the order of the items presented in the recognition test was changed. At the end of this stage, participants were debriefed of the entire procedure of the experiment including justifications for the deception.

4. Results

Confirmation of trouble free execution, validation of accuracy of the computer programs, and checking of manipulations had been the essential objectives of this phase of the study. Accordingly, there were no significant flaws detected in the procedure except for understanding of some of the instructions, which were corrected afterword. Especially, randomly assigning each participant for an experiment group while maintaining equal group sizes, were successfully executed by the online site. Further, the procedure for measuring Working Memory Capacity was properly executed without any detected errors.

The accuracy of the computer programs which calculated Recognition Sensitivity and Working Memory Capacity were validated through manually calculating randomly selected cases against the computer generated scores. For the former, the framework suggested by the Signal Detection Theory was adopted and all 10 cases reported the same results as that of the computer program. This result confirmed that the programme was free from logic errors. Similarly, working memory capacity was also calculated on the same selected cases using Partial Unit Credit Procedure (see Chapter 4 for the procedures) and, it also appeared to be free from logic errors.

Two scales used as the manipulation checks to test the effectiveness of the manipulations were tested for dimensionality and internal consistency by conducting Principal Component Analysis and Cronbach's alpha procedure respectively. Similar procedure was carried out on the other scales only to assess the aforesaid characteristics. These scales were Psychological Discomfort, Cognitive Load, Attitude towards Advertisement, and Need for Cognition.

Principal Component Analysis revealed that Music Congruence scale was unidimensional. However, item MF4 reported to have a low communality value and therefore omitted from the further analysis. After such modification, the scale explained 73.7% of the total variance. Similar analysis conducted on message complexity scale revealed that the scale too was unidimensional explaining 63.4% of the total variance. The results of the reliability test conducted using Cronbach's Alpha procedure revealed accepted alpha values associated with them. Accordingly, music congruence scale and message complexity scale indicated reliability scores as $\alpha = .82$ and $\alpha = .85$ respectively.

Psychological Discomfort scale was found to be unidimensional explaining 84.5% of the total variance. After removing the Item CL4 due to the cross loading issue, the scale to measure Cognitive Load indicated 66.9% of the total variance. Attitude towards Advertisement did not indicate any item level issue and explained 75.4% of the total variance. The Need for Cognition Scale explained 67.8% variance after dropping the item NFC3 due to low commonality values. All the scales were found to have Chronbach's Alpha values greater than .70 indicating that the scales were reliable. However, no further analysis was conducted with regard to these measures in this phase of the study. A summary of Principal Component Analysis and Reliability of all the scales is shown in Table A1.3-2.

APPENDIXES 1.3

Table A1.3-2 - Summary of Principal Component Analysis and Reliability

Scale	Total Variance	Cronbach's α
Perceived Music Message Congruence	73.7%	.82
Perceived Message Complexity	63.4%	.85
Psychological Discomfort	84.5%	.92
Cognitive Load	66.9%	.83
Attitude towards Ad	75.4%	.89
Need for Cognition	67.8%	.80

For manipulation checks, two independent sample t-tests were conducted on each congruence as well as complexity measures (see Table A1.3-3 and Table A1.3-4). The congruent condition had a mean ($M = 4.06$) higher than that of the incongruent condition ($M = 2.18$) and the t-test results indicated that such mean difference was statistically significant ($t(35) = -2.46, p < .05$). Similarly, complex message condition indicated a mean value ($M = 5.74$) higher than that of simple message condition ($M = 3.23$). As expected, this mean difference was too statistically significant ($t(35) = -6.89, p < .00$). Hence, it could be said that the manipulations introduced in this experiment appeared to be successful.

Table A1.3-3 - Descriptive Statistics for Music Congruence and Message Complexity Manipulations

Manipulation	Mean	Std Dev
Music Congruence		
Congruent	4.06	1.76
Incongruent	2.81	1.33
Message Complexity		
Complex	5.74	0.83
Simple	3.23	1.35

Table A1.3-4 - t-test Results for Manipulation Checks

Manipulation	t	sig
Music Congruence	-2.46	.02
Message Complexity	-6.89	.00

5. Conclusion

The outcome of the pilot phase of the experiment indicates no significant flaws in execution of the experiment online. Further, the procedures adopted to validate the functionality of the computer programs also indicated that the programs were functionally ready to analyse the data of the main study. Despite the small sample size, the analysis of the dimensionality and internal consistency also indicated that the scales used in the experiment were free from major issues. Finally, the manipulation checks confirm the ability of manipulated stimuli to generate the anticipated differences in stimulus perception. Therefore, it appeared that the experiment procedure was sound enough to gather the data to test the hypotheses.

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APPENDIX 2: MESSAGE MANIPULATION

Description of the Appendix –

This appendix presents the scripts of the following;

1. Initially developed messages
2. The selected message set after pretesting.

APPENDIXES 2.1

APPENDIX 2.1: Initially Developed Messages

Simple Message	Complex Message
<p>[M1S]</p> <p>What do you expect from your credit card? Surely, you need it to be cheap and rewarding. At Max-Bank, we understand that and that's why we offer you the best credit card you can get in New Zealand. Call Max-Bank hotline or visit any branch today to get yours. Max-Bank.</p>	<p>[M1C]</p> <p>Which APR do you want your credit card to charge? 12.5% or just 9.5% per annum? How many reward points do you want for a dollar spent? Just 1 or 2.5 points? Yes. We at Max-Bank offer them, and many more, to make your credit card the best in New Zealand. Call or visit any Max-Bank branch today to get yours. Max-Bank.</p>
<p>[M2S]</p> <p>We at Max-Bank, offer you the best credit card you've ever been searching for. With Max-Bank's best reward system, you can spend more every month to save more at the end. To find out further, step into any Max-Bank branch or visit our website today.</p>	<p>[M2C]</p> <p>We at Max-Bank, offer you the best credit card. You can enjoy spending with Max-Bank's 65-day long credit period, just 9.5% APR, and 2.5 reward points for every dollar spent. If you spend more with us, you save more at the end. To find out further, step into any Max-Bank branch or visit our website today.</p>
<p>[M3S]</p> <p>At Max-Bank, we know we can offer the best credit card. Why? Because our annual interest rates are the lowest in New Zealand. Max-Bank doesn't have hidden rates like other banks do. To find out more reasons to join us, step into any branch or visit our website. Max-Bank.</p>	<p>[M3C]</p> <p>At Max-Bank, we know we can offer you the best credit card. Standard APR in New Zealand is 12.5% to 20% per annum, but Max-Bank's is just 9.5%. 2nd, you can choose a payment plan that is either 1.8% of the owing balance or 4 dollars per month. 3rd for a cash advance, our rate is no higher than the normal APR. To find out more, step into any branch or visit our website. Max-Bank.</p>

APPENDIXES 2.2

APPENDIX 2.2: Selected and Modified Message Set for Recording

Script – Simple Message [M3S]

At MAX-BANK, we know we can offer the best credit card.

Why?

Because, our annual interest rates are the lowest in New Zealand.

Other banks have hidden rates, but no hidden rates at MAX-BANK.

For more reasons to join us, step into any branch or visit our website today.

MAX-BANK

The bank with a heart....

Script – Complex Message [M3C]

At MAX-BANK, we know we can offer you the best credit card.

Standard APR in New Zealand is 12.5% to 20% per annum,

but at MAX-BANK, just 9.5%.

2nd.., you choose a payment plan - either 1.8% of the owing balance or 4 dollars per month.

For a cash advance, our rate is no higher than the normal APR.

For more details, visit our website...today.

MAX-BANK

The bank with a heart....

APPENDIXES 3

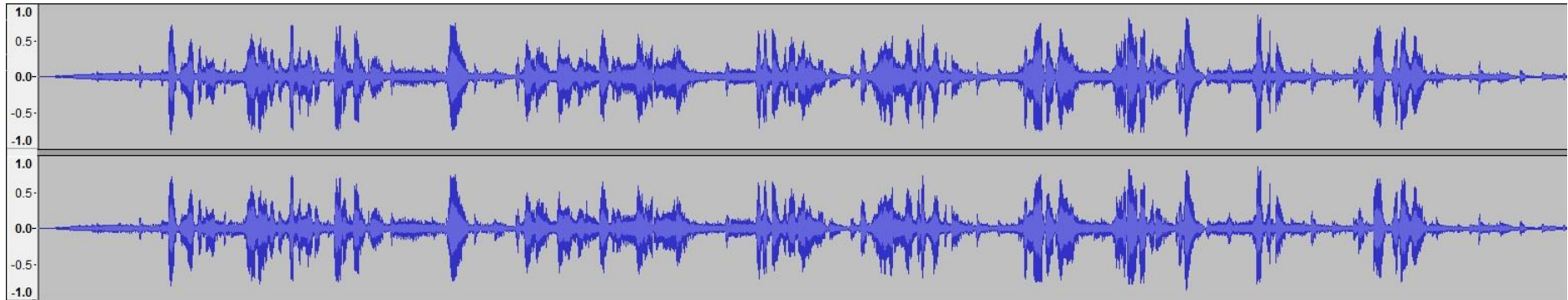
APPENDIX 3: WAVEFORMS OF THE TREATMENT ADVERTISEMENT

Description of the Appendix –

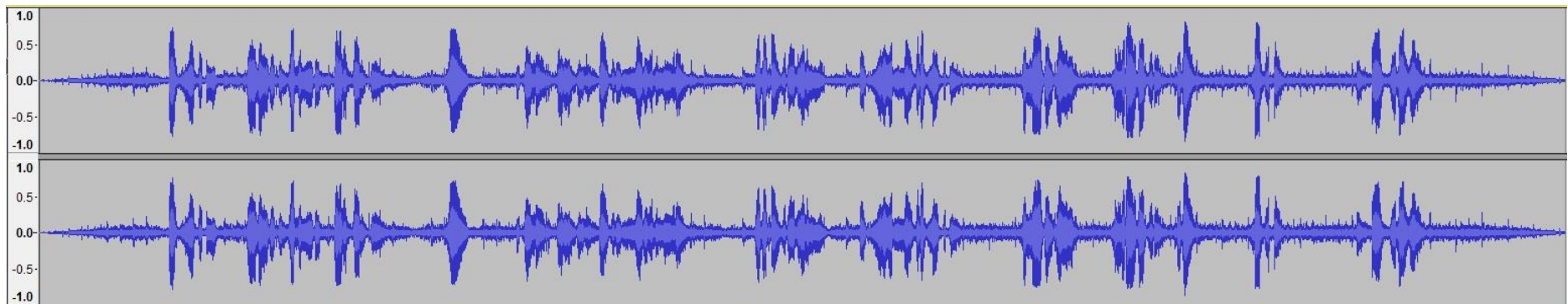
This appendix presents the waveforms of the four treatment advertisements.

APPENDIXES 3

Simple Congruent Advertisement

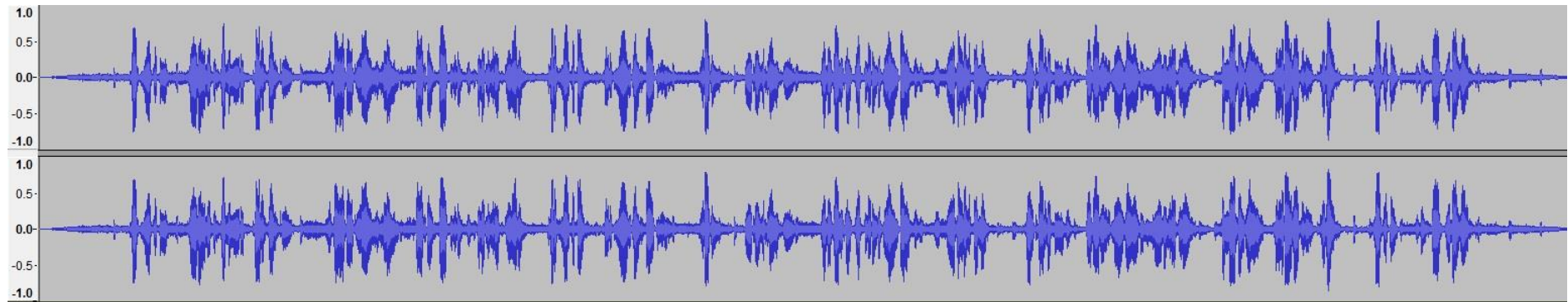


Simple – Incongruent Advertisement

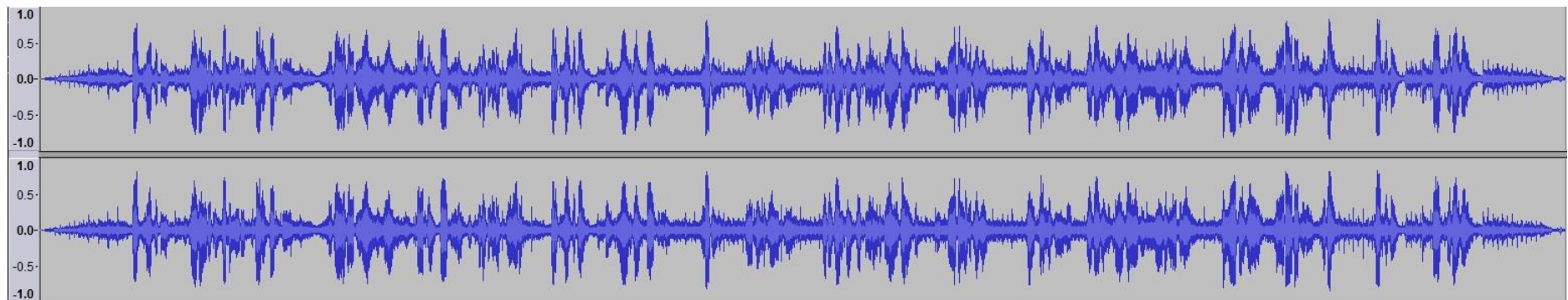


APPENDIXES 3

Complex – Congruent Advertisement



Complex – Incongruent Advertisement



APPENDIX 4: EXPERIMENT PROCEDURE

Description of the Appendix –

This appendix contained the screen shots of the Stage I and Stage II of the experiment. Only the working memory test does not show the exact screen shots but sample of it to give an idea of the presentation. Please refer the Appendix 6 for complete list of words presented in each word set. This section is broken down to the following section for signposting purposes in the body of this thesis.

Stage-I

1. Hit description
2. Welcome screen and audio testing
3. Text of involvement inducement and experiment advertisements
4. Immediate memory tests
5. Manipulation checks, Psychological Discomfort, Cognitive Load, and Attitude towards Advertisement.
6. Need for Cognition
7. Working memory capacity test
8. Demographics
9. Invitation for the stage two and the endnote

Stage-II

10. Welcome Screen
11. Delayed memory tests
12. Endnote
13. Email invitation

APPENDIXES 4.1

STAGE-I

APPENDIX 4.1: Hit Description

Title:

Effectiveness of Radio Advertisements

The aim of this study is to gain insights into the listeners' perception of radio advertisements. This study is carried out as a requirement for PhD research by Leelanga Seneviratne (email: bls50@uclive.ac.nz) of the University of Canterbury, New Zealand under the supervision of Associate Professor Ekant Veer of the University of Canterbury.

Study Description:

The study has two stages. By clicking on the following link, you will participate in the Stage 01. In this stage, you have to listen to three radio advertisements and answer the questionnaire that follows.

Approximate completion time: 15 minutes

Payment: \$0.50

We need you to take part in the second stage of this study that will ask some questions based on the first stage. We will email the link to the stage 02 (in approximately two days' time) though the email address you are requested to provide at the end of the Stage 01. The payments for the second stage will also be made in Mechanical Turk.

Approximate completion time: 04 minutes

Payment: \$1.50

The results of this study may be published, but you can be assured of the complete confidentiality of data gathered. The identity of participants will not be made public under any circumstances. To ensure confidentiality, access to data is strictly restricted to those who are directly involved in this research. Further your contact information will neither be published nor divulged to any third party and will not be used for any other purpose.

This project has been reviewed **and approved** by the University of Canterbury Human Ethics Committee (HEC 2013/34).

Special Instructions for participants:

- Make sure you have a **headset attached** to your computer and adjust the volume to a comfortable level.
- Please **do not** use mobile devices such as iPads and smart phones for participating in this survey.
- Please **do not** engage in any other activity during the survey.
- Please stay in a **non-disruptive environment**, while taking the survey.

Notes

- Please open the survey link in a new browser Tab/Window.
- Make sure you submit the confirmation code that will be provided at the end of this stage.
- You can participate in this study only for one time. Payment will only be made for single participation.

Thank you very much for your valuable time and responses

Survey link

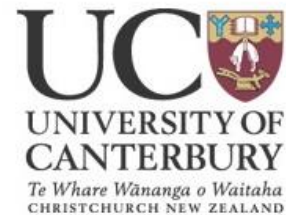
http://canterbury.qualtrics.com/SE/?SID=SV_ePCLd3R9gouFx6I

APPENDIX 4.2: Welcome Screen and Audio Testing



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Department of Management, Marketing, and Entrepreneurship
Tel: +64 3 364 2606 www.mang.canterbury.ac.nz



Effectiveness of Radio Advertisement - Stage 1

Thank you for accepting the invitation to participate in our study. This stage will take approximately **15 minutes to complete**. Please do not forget to submit the confirmation code in Mechanical Turk after completing this survey. This code will be provided to you at the end of this stage.

Special Instructions

- Make sure you have a sound device or a **headset attached** to your computer and the volume is set to a comfortable level.
- Please do not engage in any other activity during the test.
- Please stay in a non-disruptive environment, while taking the test.

- ☒ YES, I am over 18 years old and I am willing to participate in this study.
- ☐ No, I don't want to participate.

Next

APPENDIXES 4.2



This is a test audio. Please use it to check your audio device and adjust the volume.



Note: The progress bar of the audio player may not advance with the time.

☐ Yes. I am ready to start the test

Next

APPENDIX 4.3: Text of Involvement Inducement and Experiment Advertisements



(Section 1 of 6)

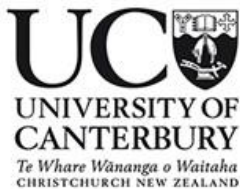
It's all in the sound!

The three radio advertisements used in this experiment are considered to have unique characteristics that are highly regarded by many scholars and advertisers around the world. Therefore, please listen to each ad attentively and tell us honestly how you feel about them.

Please listen to the advertisements only **once**.

Click the "Next" button to continue.

Next




Please click on the play arrow and listen to all **THREE** advertisements. They are separated by 1 second intervals. (The first ad will start in a few seconds.)



☐ I've finished listening to all three ads

APPENDIX 4.4: Immediate Memory Tests



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(Section 2 of 6)

In this section, please think about the advertisements you just listened to and answer the questions. In some cases you have to type the answers and in other cases you have to choose from the provided options.

Next

APPENDIXES 4.4

Immediate Recall Test



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(Q2.1). Please recall and list down what **products** were advertised in the advertisements of this study.
Eg. Chocolate

(Q2.2). Please write down any **brand name(s)** you can recall from these advertisements.

(Q2.3). Please take a moment to recall **as many parts of the messages as possible** from the advertisements you listened to in this study and write them down in the following box. You can type them in any order.

Next

Immediate Recognition Test – Part 1



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(Q2.4). Please state whether you heard the following in the advertisements of this study.

	Yes - Heard this	No - Didn't hear
1. Insurance	<input type="radio"/>	<input type="radio"/>
2. Nissan	<input type="radio"/>	<input type="radio"/>
3. Bank	<input type="radio"/>	<input type="radio"/>
4. Toyota	<input type="radio"/>	<input type="radio"/>
5. Credit card	<input type="radio"/>	<input type="radio"/>
6. Furniture	<input type="radio"/>	<input type="radio"/>
7. Argos	<input type="radio"/>	<input type="radio"/>
8. Max bank	<input type="radio"/>	<input type="radio"/>
9. Realtor	<input type="radio"/>	<input type="radio"/>
10. Interest rate	<input type="radio"/>	<input type="radio"/>

Immediate Recognition Test – Part 2

(Q2.5). Please go through the following messages carefully and state whether you heard them in the advertisements.

	Yes - Heard this	No - Didn't hear
1. Shortest vehicle in the world	<input type="radio"/>	<input type="radio"/>
2. Our annual interest rates are the lowest in New Zealand	<input type="radio"/>	<input type="radio"/>
3. Fastest vehicle	<input type="radio"/>	<input type="radio"/>
4. Cheapest Internet services in New Zealand	<input type="radio"/>	<input type="radio"/>
5. You can choose a payment plan	<input type="radio"/>	<input type="radio"/>
6. No hidden interest rates	<input type="radio"/>	<input type="radio"/>
7. Helping you live for less	<input type="radio"/>	<input type="radio"/>
8. Cash-advance rates are no higher than normal APR	<input type="radio"/>	<input type="radio"/>
9. Looks can be deceiving	<input type="radio"/>	<input type="radio"/>
10. One point eight percent of owing balance	<input type="radio"/>	<input type="radio"/>
11. Other banks have hidden rates	<input type="radio"/>	<input type="radio"/>
12. Relax in the comfort of your own garden	<input type="radio"/>	<input type="radio"/>

Next

APPENDIXES 4.5

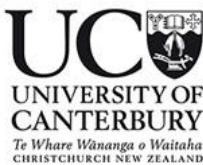
APPENDIX 4.5: Manipulation checks, Psychological Discomfort, Cognitive Load and Attitude towards Advertisement



(Section 3 of 6)

In this section, you will listen again to one of the three advertisements you previously listened to. This time pay attention to the contents of it and the feelings you may get as a result of listening to it. Then answer the questions appear afterwards.

Next



Now think **ONLY** about this advertisement and answer the questions in the following section.

(Q3.1) Please rate the extent to which you agree/disagree with the following aspects of this advertisement (ad).

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
01. The background music used in this ad was <u>appropriate</u> for the contents of the ad.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
02. The <u>contents</u> of this ad was <u>complex</u> .	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
03. I had to <u>keep track of many things</u> in my mind to <u>understand the contents</u> of this ad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
04. The <u>message</u> of this ad was <u>simple</u>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
05. There were <u>many parts</u> to the <u>message</u> of this ad.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
06. The <u>message</u> of this ad conveyed <u>lots of information</u> .	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
07. The <u>music</u> in the ad did <u>NOT</u> seem to <u>fit</u> with the <u>message</u> .	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
08. The <u>music</u> in the ad <u>did NOT match</u> the <u>product</u> in the ad.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
09. The <u>music</u> in the ad was <u>congruent</u> with its message.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Next

APPENDIXES 4.5

Considering **this advertisement**, please rate the extent to which you agree/disagree with the following statements on how **you felt** when listening to it.

(Q3.2) When listening, _____

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
01. This ad made me feel <u>uncomfortable</u> .	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
02. I had to put some <u>mental effort</u> to <u>understand the content</u> of this ad.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
03. This ad made me feel <u>bothered</u> .	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
04. I had to <u>think hard</u> to <u>understand the contents</u> of this ad.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
05. The <u>pace</u> of this ad was <u>hurried or rushed</u> .	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
06. I was <u>successful</u> in understanding the <u>content</u> of this ad.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
07. This ad made me <u>feel</u> mentally <u>uneasy</u> .	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
08. I was <u>irritated/ annoyed</u> because of this ad.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Next

(Q3.3) This advertisement was:

Good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Bad
Interesting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Boring
Pleasant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Unpleasant
Likable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Unlikable

Next

APPENDIXES 4.6

APPENDIX 4.6: Need for Cognition



(Section 4 of 6)

This section does not refer to the advertisements, but it rather refers to certain characteristics of you. Please answer the questions as honestly as possible.

Please rate the extent to which you agree/disagree with the following statements. Note that there are no right or wrong answers.

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
01). I would rather do something that requires little thought than something that is sure to challenge my thinking abilities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
02). I try to anticipate and avoid situations where there is a likely chance I will have to think in depth about something.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
03). I only think as hard as I have to.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
04). The idea of relying on thought to make my way to the top does NOT appeal to me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
05). The notion of thinking abstractly is NOT appealing to me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Next

APPENDIX 4.7: Woking Memory Capacity Test



(Section 5 of 6)

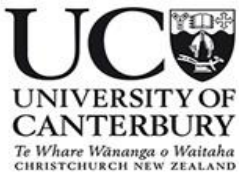
In this section, you will see some words appear at one second intervals. Remember those words until you are asked to recall them in the correct sequence. There are between 3 and 7 sets of words in a sequence.

For example, if the Word 1 is "Wall" and the Word 2 is "Grass," then type them **in the correct order** (Wall, Grass) in the respective boxes. Type only the words you can recall. If you cannot recall a word, just leave that box blank.

IMPORTANT: Please DO NOT rehearse or write down the words as they appear.

Please click on the "Next" to start the words appearing.


Next



Move

[Automatically advanced to next word after one second]






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Flute

[Automatically advanced to next word after one second]



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Check

[Automatically advanced to recall screen after one second]

APPENDIXES 4.7



[Participants have to click on next button after filling the boxes to get next set of words]

Please recall the three words and type them down in correct order.

Word1

Word2

Word3

Next

Words 1

See Appendix 6 for word list

Words 5

APPENDIXES 4.7



[Participants have to click on next button after filling the boxes to get next set of words]

Please recall the five words and type them down in correct order:

Word 1	<input type="text"/>
Word 2	<input type="text"/>
Word 3	<input type="text"/>
Word 4	<input type="text"/>
Word 5	<input type="text"/>


Next

Words 1

See Appendix 6 for word list

Words 7

APPENDIXES 4.7



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Please recall the seven words and type them down in correct order.

Word 1

Word 2

Word 3

Word 4

Word 5

Word 6

Word 7

Next

[In the main experiment, two sets of each of these blocks were randomly presented except for the first block. Hence the order of the blocks in the main experiment was not as same as presented in this appendix.]

APPENDIX 4.8: Demographics



(Section 6 of 6) - Final section.

In this section, we would like to gather some background information about you that will help us to understand how individual differences could impact on the effectiveness of an ad. Your information will be kept strictly confidential.

Next

APPENDIXES 4.8

	Not at all		Somewhat		Very much
(Q5.1). How musical are you?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(Q5.2) In general, how involved / engaged did you feel when you took part in this experiment?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(Q6.3). Please choose the three music genres / types you like most

<input type="checkbox"/> Blues	<input type="checkbox"/> Heavy metal	<input type="checkbox"/> Funk
<input type="checkbox"/> Folk	<input type="checkbox"/> Rock	<input type="checkbox"/> Hip-Hop
<input type="checkbox"/> Classical	<input type="checkbox"/> Country	<input type="checkbox"/> Soul
<input type="checkbox"/> Jazz	<input type="checkbox"/> Religious	<input type="checkbox"/> Electronica
<input type="checkbox"/> Alternative	<input type="checkbox"/> Pop	<input type="checkbox"/> (Other)

(Q6.4). How often do you listen the radio (approximate hours per week)?

Less than 1 hour	1 - 5 hours	6 - 10 hours	11 - 15 hours	16 - 20 hours	More than 20 hours
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(Q6.5). You are:

☐ Male
☐ Female
☐ Prefer not to answer

Did you you understand the accent of the advertisement in this study that you listened to for the second time?

☐ Yes
☐ No

(Q6.6). Your age group:

18 - 20	21 - 23	24 - 26	27 - 29	30 - 32	33 - 35	36 - 38	39 - 41	42 and above	Prefer not to answer
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please enter MTurk worker ID.

(Note: This will only be used for making payments and will not be used for any other purpose.)

Next

APPENDIXES 4.9

APPENDIX 4.9: Invitation for the Stage-II and the Endnote



Finally, in order to complete this study we need your participation in the second stage as well. For that we will contact you in approximately **2 days'** time.

- Time needed to complete the second stage is **approximately 04 minutes**.
- You will be paid **\$1.00 for completing the second stage** (in addition to the payment for this stage).
- Only those who completed this stage will be eligible for the second stage and we will send you the link only through an email.

In order to contact you for the second stage, please be kind enough to provide your email address.

Note: *This information will only be used to contact you for this research purpose and will NOT be given to any other party. It will be kept confidential.*

Email address

Next



Excellent!!! You made it to the end of the study.

We reassure you that the information you provided will be strictly confidential and will only be used for the purposes of this research.

We are extremely grateful for your participation in this study.

PLEASE respond to the email we will send you in 2 day's time, it will only take about 4 minutes to complete.


Below is your **Mechanical Turk** confirmation code:

93613

Thank you so much and hope to hear from you once again.
Have a good day!

STAGE-II


APPENDIX 4.10: Welcome Screen



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College of Business and Law

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Effectiveness of Radio Advertisements - Stage 02

Hello welcome back!

Thank you very much for coming here again to help us complete our study. Please enter the confirmation code sent to you with the email you received from us.

This stage will take approximately 04 minutes to complete.

Your confirmation code:

Survey Completion

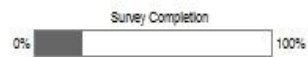
0% 100%

>>

APPENDIXES 4.10




Please **think** about the **advertisements** you listened to **in the stage 01 of this study**. Then answer the questions appear next. In some cases you have to type the answers and in other cases you have to choose from the provided options.



>>

APPENDIX 4.11: Delayed Memory Tests



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(Q1). Please recall and list down what **products** were advertised in the advertisements of this study.
Eg. Chocolate

(Q2). Please write down any **brand name(s)** you can recall from those advertisements.


(Q3). Please take a moment to recall **as many parts of the messages as possible** from the advertisements you listened to in this study and write them down in the following box. You can type them in any order.

Survey Completion

0%100%

>>

Recognition Test – Part 1



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Considering the advertisements in this study, please select the relevant answers from the list below each question.


(Q4). Please state whether you heard the following in the advertisements.

	Yes - Heard this	No - Didn't hear
1. Argos	<input type="radio"/>	<input type="radio"/>
2. Realtor	<input type="radio"/>	<input type="radio"/>
3. Max bank	<input type="radio"/>	<input type="radio"/>
4. Furniture	<input type="radio"/>	<input type="radio"/>
5. Toyota	<input type="radio"/>	<input type="radio"/>
6. Nissan	<input type="radio"/>	<input type="radio"/>
7. Credit card	<input type="radio"/>	<input type="radio"/>
8. Interest rate	<input type="radio"/>	<input type="radio"/>
9. Insurance	<input type="radio"/>	<input type="radio"/>
10. Bank	<input type="radio"/>	<input type="radio"/>

Survey Completion

0% 100%

Recognition Test – Part 2



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(Q5). Please go through the following messages carefully and state whether you heard them in the advertisements.


	Yes - Heard this	No - Didn't hear
1. Fastest vehicle	<input type="radio"/>	<input type="radio"/>
2. Cheapest Internet services in New Zealand	<input type="radio"/>	<input type="radio"/>
3. Helping you live for less	<input type="radio"/>	<input type="radio"/>
4. No hidden interest rates	<input type="radio"/>	<input type="radio"/>
5. Our annual interest rates are the lowest in New Zealand	<input type="radio"/>	<input type="radio"/>
6. Shortest vehicle in the world	<input type="radio"/>	<input type="radio"/>
7. Looks can be deceiving	<input type="radio"/>	<input type="radio"/>
8. You can choose a payment plan	<input type="radio"/>	<input type="radio"/>
9. Cash-advance rates are no higher than APR	<input type="radio"/>	<input type="radio"/>
10. Relax in the comfort of your own garden	<input type="radio"/>	<input type="radio"/>
11. One point eight percent of owing balance	<input type="radio"/>	<input type="radio"/>
12. Other banks have hidden rates	<input type="radio"/>	<input type="radio"/>

Survey Completion

0%100%

>>

APPENDIX 4.12: *Endnote*



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All Done!

Please confirm your email address by re-entering it in the following cage with the MTurk workerID. Please enter **the same email address you provided us in the stage 1**. It will help us to cross check information for making payments.

NOTE: This information will only be used in this research and for making payments. They will NOT be used for any other purpose.

Email address

MTurk Worker ID

Survey Completion
0% 100%

>>

APPENDIX 4.13: Sample email invitation to Stage-II

Hello,

Thank you so much for taking part in the stage 1 of this study in **Mechanical Turk**. This is the **second stage of the same survey** you participated in two days ago. As I mentioned in the first stage, I need another **02-04 minutes of your time** to fully complete the study. All you have to do in this stage is to answer few questions about the previous stage.

Please take part as soon as you see this email as the time gap between two stages are important for the experiment. For this stage, you CAN use any mobile devices such as smart phones or iPads.

So PLEASE click on the following link. You will be paid **\$1.00** bonus in **Mechanical Turk** once you **complete** this stage.

Please enter the **confirmation code** below at the beginning of the survey.

19489

Link

http://canterbury.qualtrics.com/SE/?SID=SV_eXQ7DzcPRzXYg2V

THANK YOU VERY MUCH once again for your participation.

Warm regards!
Leelanga Seneviratne
PhD Candidate
University of Canterbury
New Zealand

APPENDIXES 5

APPENDIX 5: MARKING SCHEME OF RECALL TEST

Description of the Appendix –

This appendix presents the strict and detailed instructions provided for the markers to mark the recall tests.

APPENDIXES 5

RECALL TEST - MARKING INSTRUCTION SHEET

Participants of this experiment were exposed to three advertisements one of which was the target while the other two were lures. In this recall test, participants were asked to recall the contents of the advertisements mainly in three groups, Category recall, brand recall, and message recall. Please ignore everything related to lure advertisements and only search for the answers with regard to the target. A brief description of each group is listed below.

Category Recall:

(Q) Please recall and list down what products were advertised in the advertisements of this study.

Participants were required to recall the category that each ad belongs to. There are three possible answers including the target category (credit card).

Brand Recall:

(Q) Please write down any brand name(s) you can recall from these advertisements.

Participants were required to list down the three brand names they heard in the advertisements.

Message Recall:

(Q) Please take a moment to recall as many parts of the messages as possible from the advertisements you listened to in this study and write them down in the following box. You can type them in any order.

Again, participants are required to recall many parts of the messages that they could recall from the advertisements. In this regard, the order of the points listed would be immaterial, but the contents are.

For the following groups (category recall and brand recall) please look for the same words as listed below except for the situations you are instructed to do otherwise.

Category Recall

Answer	Marks
Credit card	1.00
Financial / Banking services	0.75
Bank loan	0.50
Bank Product / account	0.35
Bank	0.25

Brand Recall

Answer	Marks
Max Bank	1.00
Max	1.00
Fully sounds like Max or Max Bank. Eg. Macs, Maks, Mex, Nex	1.00
Anything that sounds close to Max bank but it does not fully sound like it. Eg. Matt, Next	0.75

APPENDIXES 5

For the following groups, please look for the following contents in the answers. However, do not look for a verbatim (exact word to word match). The answers may vary in order of facts presented or the articulations. Therefore, your judgement for correct contents is expected. Please use the marks given in front of each message part. Please use this as the cap. When answers are deviated, assign a mark between 0 and the cap. You should consider either one of, not both, the following answers when marking the items come under “*One of the following.*”

Message Recall – Simple

Answer	Marks
Offer the best credit card	1.00
Annual interest rates are the lowest	1.00
Other banks have hidden rates but no hidden rates with Max bank (if one of these claims, then half marks)	1.00 / 0.50
Bank with a heart	1.00

Message Recall – Complex

Answer	Marks
Offer the best credit card	1.00
<i>One of the following</i> Standard APR / Interest rate is 12.5% to 20% Low interest rate than the normal	1.00 0.50
Max bank interest rate is 9.5%	1.00
<i>One of the following</i> Max bank (our) cash advances rate is no higher than normal APR/ Interest rate Cash advances are same as normal rates	1.00 1.00
You (we) (can) choose your (our) payment plan	1.00
1.8% of the owing balance or just 4% per month (0.5 marks if one of these are right)	1.00
Bank with a heart	1.00
Answer contains general understanding of message. Eg. Max bank credit card was better than the other They compare rates to tell they offer the best credit card	0.25

Single answer may contain more than one part of the above. So, you have to give marks to each separately and put the sum as the total mark on the column in front.

APPENDIXES 5

Sample Recall Sheets

University of Canterbury Confidential Delayed: Brand Recall 24/10/2013

Page 1

Delayed - Brand

Response ID	Gen ID	Answer	Marks
R_bDQR5IZYB51IT41	2210-1	toyota Max credit card can't recall furniture	1.00
R_7284KcXM5ACtNSI	2210-2	Max Bank, Toyota	1.00
R_9mov9Xne5m36i1v	2210-3	MaxBank, Toyota	1.00
R_5ANjY5RQkujlZuB	2210-4	The bank started with an M?	0.00
R_a95TfBBnZxRuCeF	2210-5	makers bank	0.00
R_cBKsfGjf5dpcbM9	2210-6	maxcard, argos, ??	1.00
R_cVioWDvxVYqIEUR	2210-7	Toyoto-car	0.00
R_brbtIEUfavdS6Z7	2210-8	Argos Max bank Toyota	1.00
R_8jlFysy4sawWoAt	2210-9	Argos	0.00
R_8uMFrnadX9vw8AZ	2210-10	Toyota, Murbank, Aton	0.00
R_3KpdxRtF6WzfN7T	2210-11	Toyota	0.00
R_9N8YCpOkOXWEALP	2210-12	Max Bank, Toyota	1.00
R_8dMXw9et1Wm4lQt	2210-13	Godiva	0.00
R_3n2AN58tlwDHxs1	2210-14	Max credit bank?	1.00
R_0c6gi7blruMZ91H	2210-15	Max bank, Argos, Toyota	1.00
R_9EnC3Ce1H7iUfBP	2210-16	Toyota	0.00
R_0GjKZcqQPTnSJEx	2210-17	MaxBank, Argos, Toyota	1.00
R_2czVI2uNW4RohMN	2210-18	Max bank Toyota and I'm not sure	1.00
R_ctHH9QheAj0s9GI	2210-19	toyota,max bank, argoss	1.00
R_3t5cch6hRXDrtE9	2210-20	Toyota	0.00
R_9BjScLv9XSdt3Qp	2210-21	Argus , bank max, toyota	1.00
R_6mwH0WiuEccjQ5T	2210-22	Toyota next bank	0.75
R_cUeB0etNf1fK9i5	2210-23	Maxbank, Argos, Toyota	1.00
R_cwhpFETy6PgIXD7	2210-24	max bank	1.00
R_8IZDV8qwFI5WLhb	2210-25	toyota max bank beach	1.00
R_3ghYoMOpEcdqHLn	2210-26	next bank ,toyota	0.75
R_cupST2XpII5GZCt	2210-27	1 Max Bank	1.00
R_1SuB0v0Yk6gM1Xn	2210-28	Bank Max Toyota	1.00
R_5c2FyEKavKKtHet	2210-29	credit cards	0.00
R_4ZUIGGoM5bz2Le5	2210-30	Max Bank	1.00
R_eFCghxftRVWgZ5X	2210-31	Don't remember the name of the bank The furniture was Agros or Argos The car was Toyota	0.00
R_bsaxyLsBsU8dHRb	2210-32	Max Bank	1.00

APPENDIXES 5

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Message-Complex 20/10/2013

Page 1

Message-Complex

Response ID	Gen ID	Answer	Marks
R_5BINleMxrQGsDoV	2010-1	The bank with the heart 1	1
R_elyocdVPdPS101L	2010-2	the banking commercial focused on lower rates 0.5 the furniture store played a clever game with static to make me picture the beach } the Toyota commercial was for a car x	0.5
R_8odhdnT1R8kKo97	2010-4	you choose your own payment plan, beach sounds up and down, 1	1
R_1ALmA7eUrrMemIR	2010-7	9 5% apr on the credit card x 1 Argos x annoying static x Toyota car is short x }	1
R_0TfGusZKJfFKgqp	2010-8	a bank with low payments and low APR on credit cards (a bank that cares) 1.5 relax in your own garden with our furniture x a haiku about city living x city driving x }	1.5
R_3JemPkmBqMPgEEB	2010-9	I can't recall x	0
R_SuyB5TenoRFAdzD	2010-10	Tune your radio to static, turn it up, then turn it down x Suv on a side street x 9% interest rate, check cashing at low APR 1.4	1.4
R_e3xs5xTgg9JIJct	2010-12	Yoyota the shortest car x The credit card percentage of 9% bank of australia 0.9 }	0.9
R_6LMNHD435DZtM6F	2010-13	Very hard to remember any part of first ad due to metal music playing in background x Second ad I remember static being turned up and down being correlated to a beach, and then a push to just buy a companies inexpensive lawn furniture instead x Third ad I remember a narrow side street being compared to a thunderstorm for an SUV, and then a push for Toyota with soothing Japanese music x	0
R_eBRKLw79wDPLBlz	2010-16	maxbank had low interest rate cards with low monthly payments(1 - (1+0.5) 8% or \$4 a month), fake an ocean with your radio static or buy garden furniture for your own garden this weekend, x a haiku about narrow aide streets and the shortest car in the world the IQ i think x }	1.5

APPENDIXES 6

APPENDIX 6: WORDLIST OF WORKING MEMORY CAPACITY TEST

Description of the Appendix –

This appendix presents the words used in the working memory capacity test. This word set is a subset of words carefully chosen for the study of Engle, Tuholski, Laughlin, and Conway (1999) and Lin (2007).

APPENDIXES 6

Three word sets

Set 1

Chalk
Bush
Side

Set 2

Mind
Rat
Plant

Five word sets

Set 1

Tin
Clouds
Class
Oil
Chance

Set 2

Move
Kid
Ball
Mold
Face

Seven word sets

Set 1

Flute
Box
Course
World
Baby
Church
Floor

Set 2

Check
Town
Table
Soil
Jam
Hair
Map

APPENDIXES 7

APPENDIX 7: ENDNOTES OF EXPERIMENT

Description of the Appendix –

This appendix presents the debriefing given to the participants and the thanking note presented for withdrawn participants.

Experiment Debriefing

Study Debriefing

You just completed a research project concerned with the influence of background music on consumer memory. Since we are measuring the memory effects, it is important that our participants do not know what they are tested for, before testing in order to prevent any deliberate attempts to remember the contents of the advertisement.

What was tested?

We wanted to test how background music that “fit” (and do not “fit”) with advertisement in different levels of complexity (high vs low) would result in memory. We also wanted to measure, how cognitive-load and cognitive-dissonance resulted by each of the above testing conditions (i.e background music and message) would affect memory. Finally, for adjusting any individual differences that may affect the results, we took measurements of your working-memory capacity and need-for-cognition.

How was this tested?

This study had two stages. In stage-I, you were randomly placed in one of the four research groups. Each group had an advertisement we designed with specific type of music and message in it (target advertisement).

During the process, you were asked to evaluate five advertisements. At the end of each advertisement the questions you answered were pertaining to cognitive-load and cognitive-dissonance created by each. After listening to all these advertisements, you were asked to complete some tests that measured memory regarding the contents of the target advertisement. The tests appeared subsequently (which asked you to fill the words in order of appearance) was to measure your working memory capacity and need-for-cognition.

In the stage-II, we measured how much of memory with respect to the advertisement retained after approximately 48 hours. What we measured in this stage was very similar to the memory tests in the previous stage. However, we did not mention this actual purpose, to prevent your trying to remember the contents.

What will happen next?

The results of the project may be published, but you are assured of the complete confidentiality of data gathered in this investigation: the identity of participants will not be made public whatsoever. To ensure confidentiality, access to data is strictly restricted to people who are directly involving in this research. Further, your contact information will neither be published nor divulged to any third party and will not be used for other purposes than this research. Such information will be deleted from all data sources soon after the completion of this study.

What if I want to know more?

If you have any questions and concerns about this study or need a summary of the research findings, please contact the researcher Leelanga Seneviratne (TP: +64221260440, email: bls50@uclive.ac.nz). For further concerns, you may also contact the supervising faculty member Associate Professor Ekant Veer (email: ekant.veer@canterbury.ac.nz).

Please be kind enough not to disclose the contents of this study including the true purposes to anyone until end of 2013 as it might affect the results of this study.

Thank you very much for your participation.

APPENDIXES 7

Withdrawn Note

Thank you for considering participating in this experiment.

You have decided not to participate. If you selected the “No” option accidentally, please revisit the link and select “Yes.” If you have any concerns that need clarification before participating, please contact me (Leelanga Seneviratne, email: bls50@uclive.ac.nz). I am happy to answer your questions.

Have a good day!

APPENDIXES 8

APPENDIX 8: HUMAN ETHICS APPROVAL

Description of the Appendix –

This appendix presents the Human Ethics Approval granted by the Human Ethics Committee of the University of Canterbury, New Zealand.



HUMAN ETHICS COMMITTEE

Secretary, Lynda Griffioen
Email: human-ethics@canterbury.ac.nz

Ref: HEC 2013/34

15 May 2013

Buddhakoralalage Seneviratne
Management, Marketing and Entrepreneurship
UNIVERSITY OF CANTERBURY

Dear Buddhakoralalage

The Human Ethics Committee advises that your research proposal "Influence of background music in advertisements on consumer memory" has been considered and approved.

Please note that this approval is subject to the incorporation of the amendments you have provided in your email of 14 May 2013.

Best wishes for your project.

Yours sincerely

A handwritten signature in black ink, appearing to read 'L. MacDonald'.

Lindsey MacDonald
Chair
University of Canterbury Human Ethics Committee

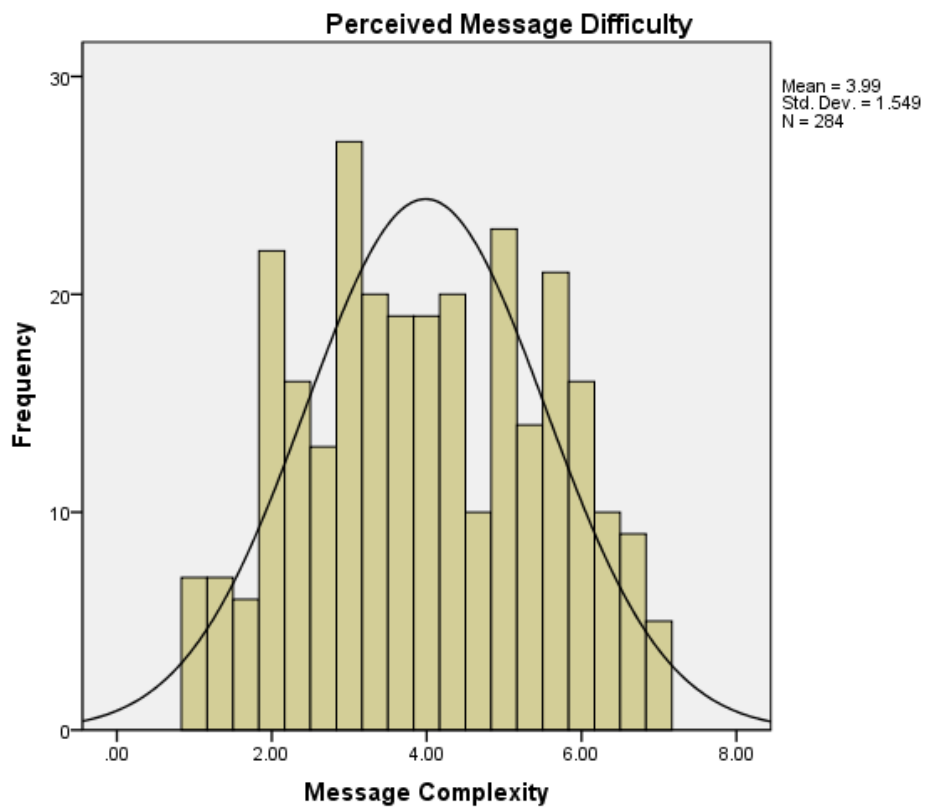
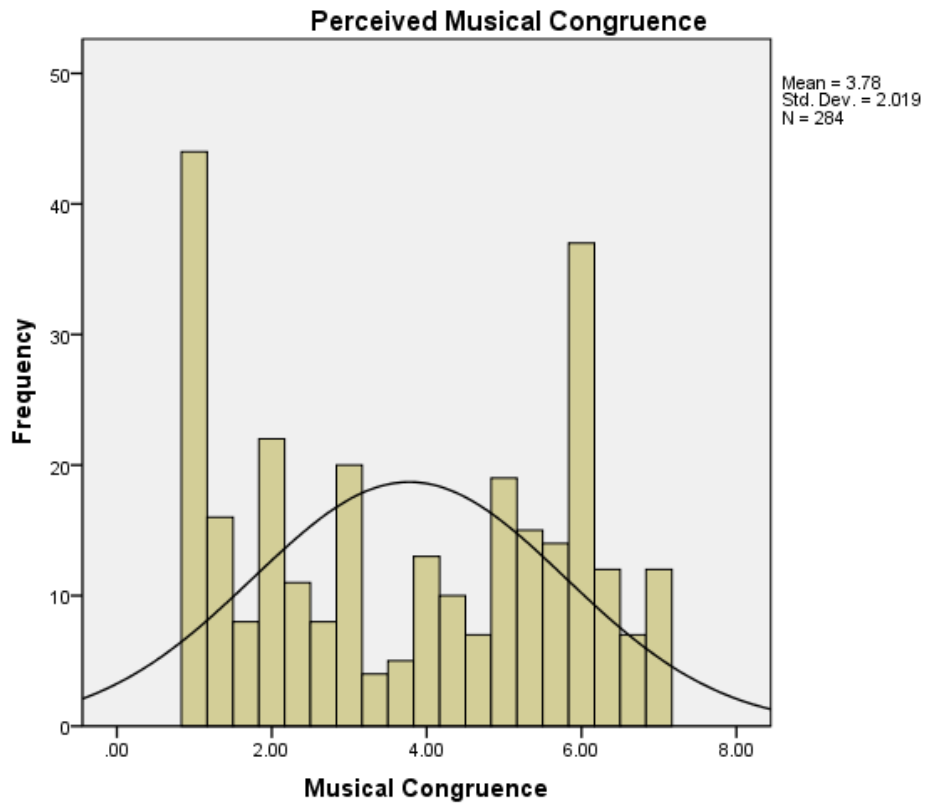
APPENDIXES 9

APPENDIX 9: HISTOGRAMS

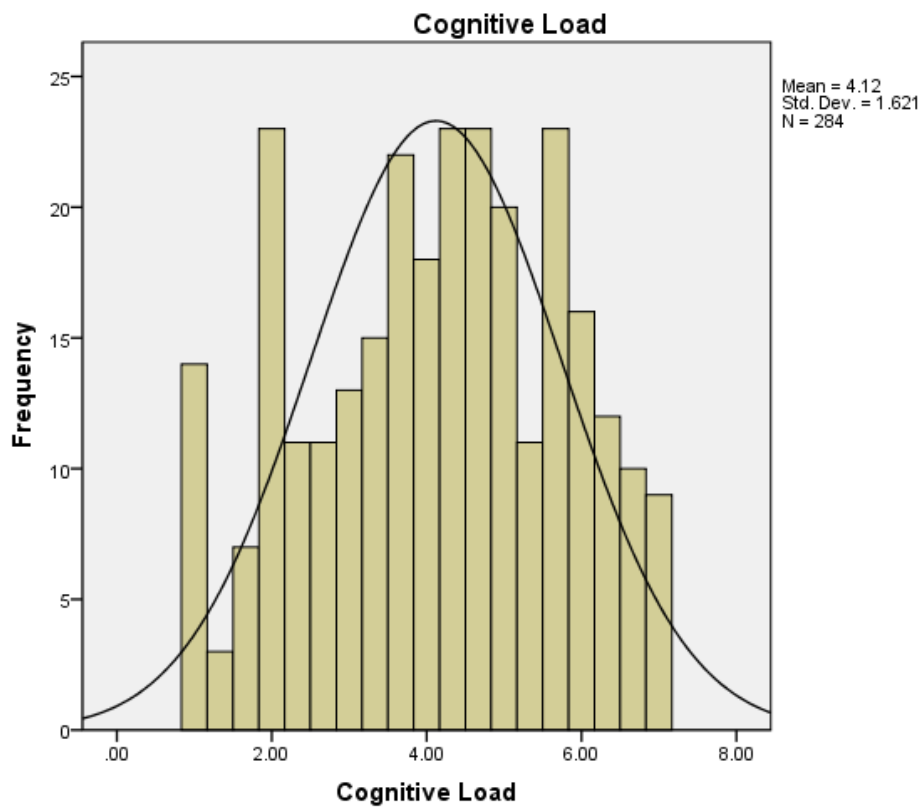
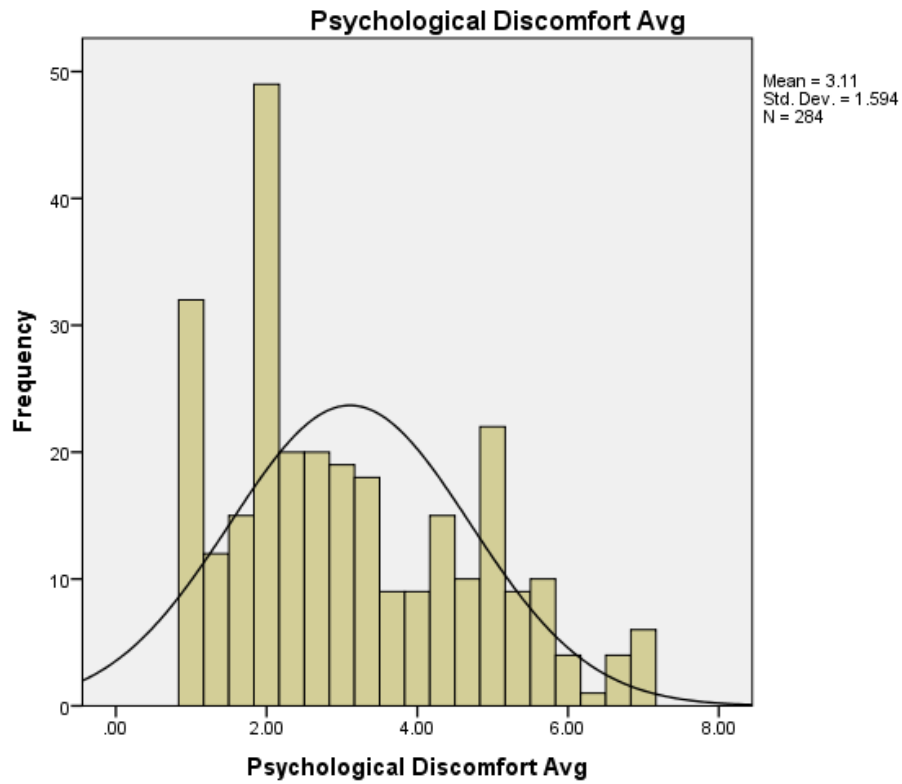
Description of the Appendix –

This appendix presents the histograms with the normal curve pertaining to each construct used in this study.

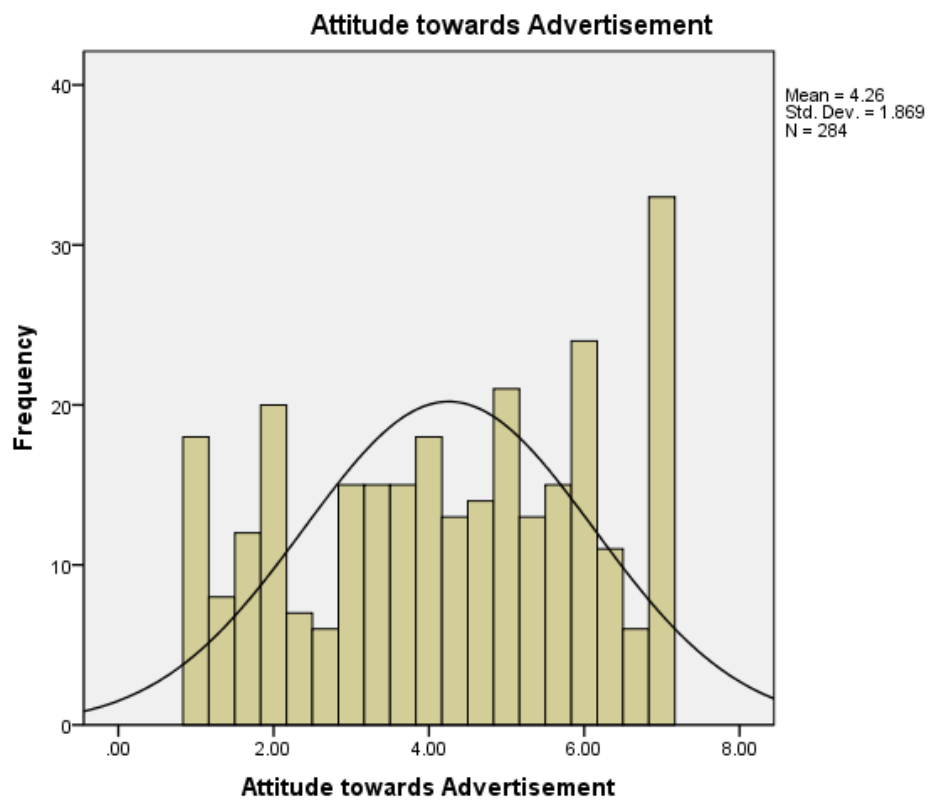
APPENDIXES 9



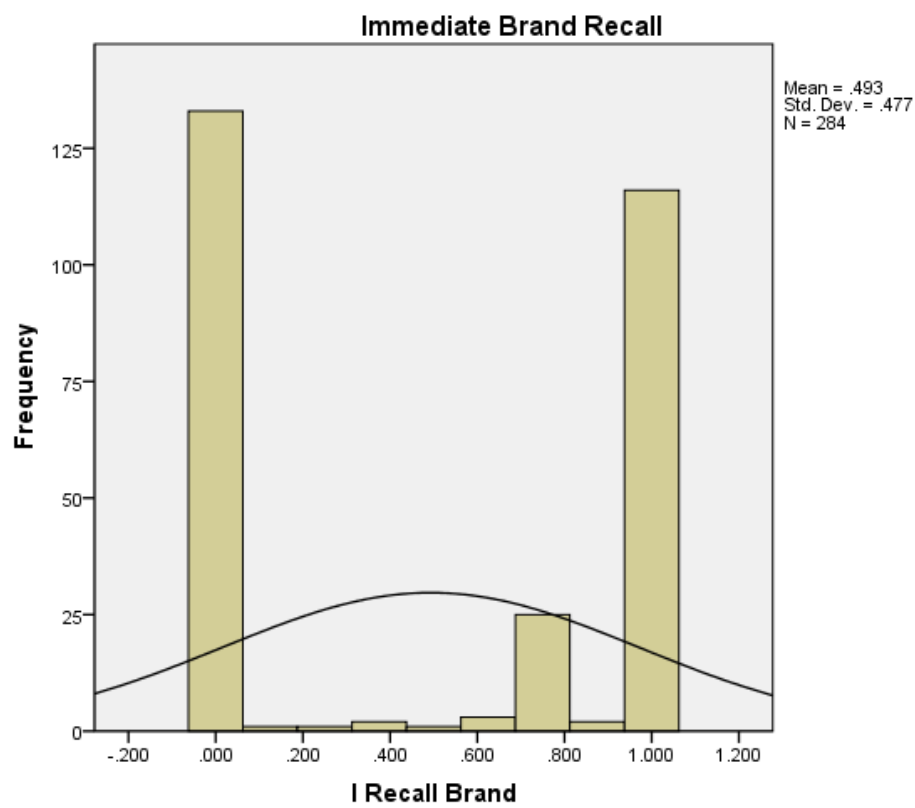
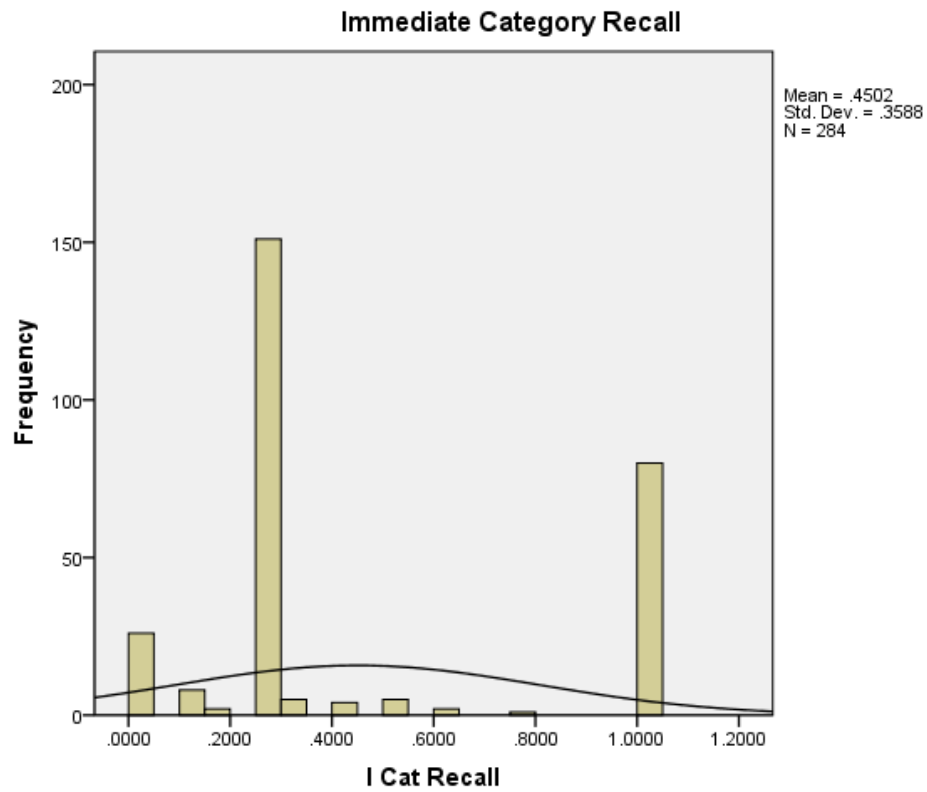
APPENDIXES 9



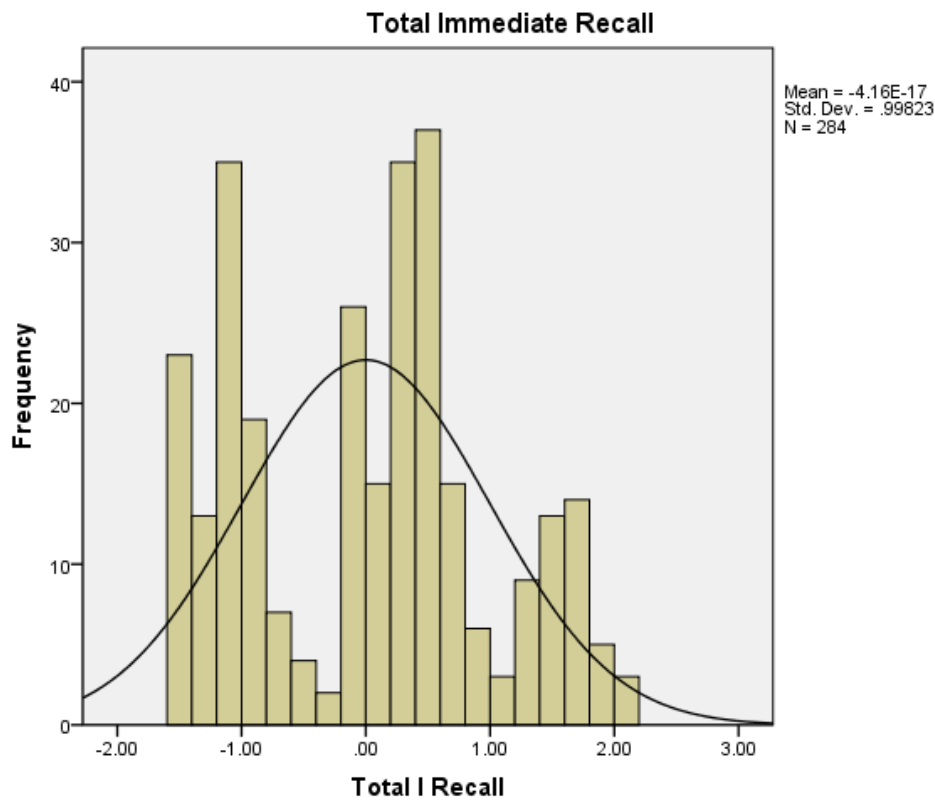
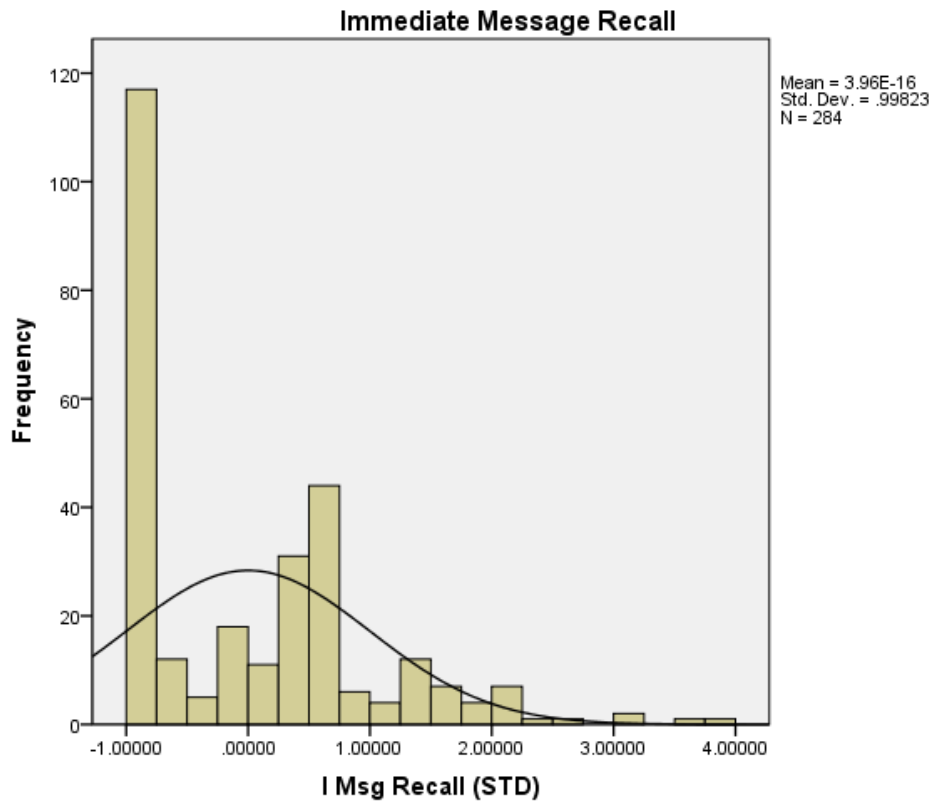
APPENDIXES 9



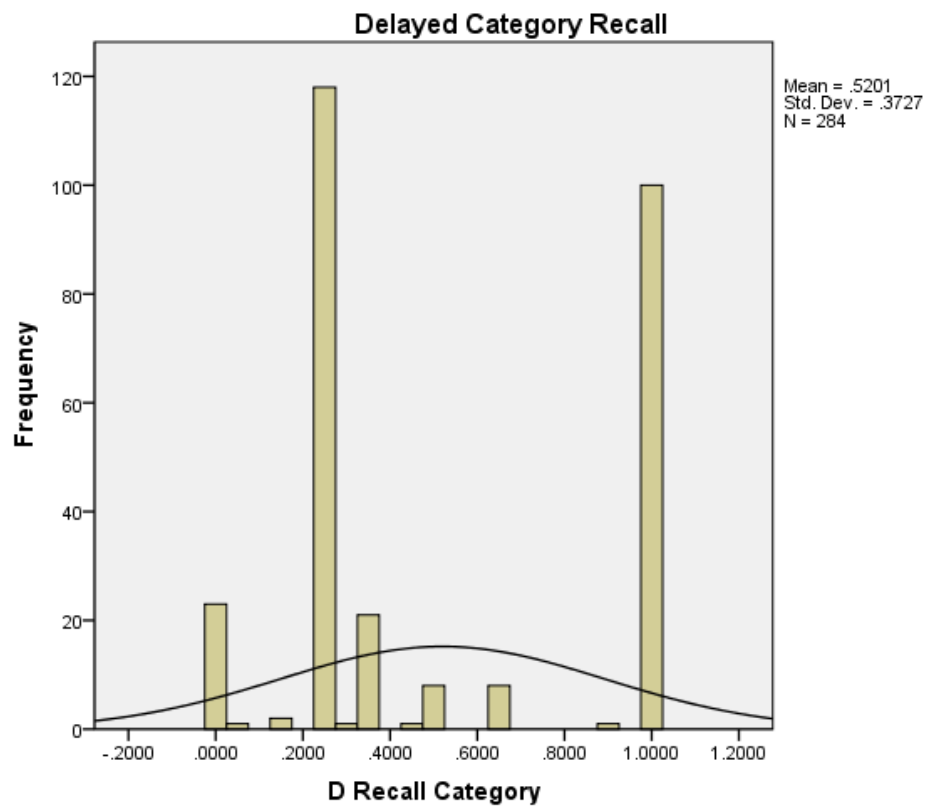
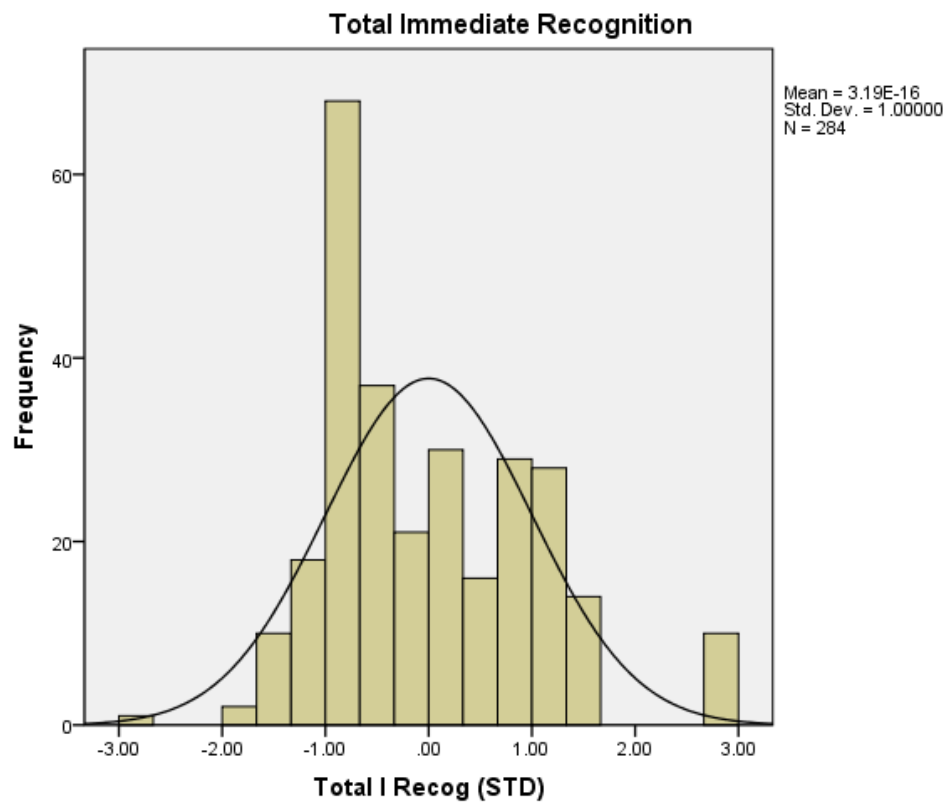
APPENDIXES 9



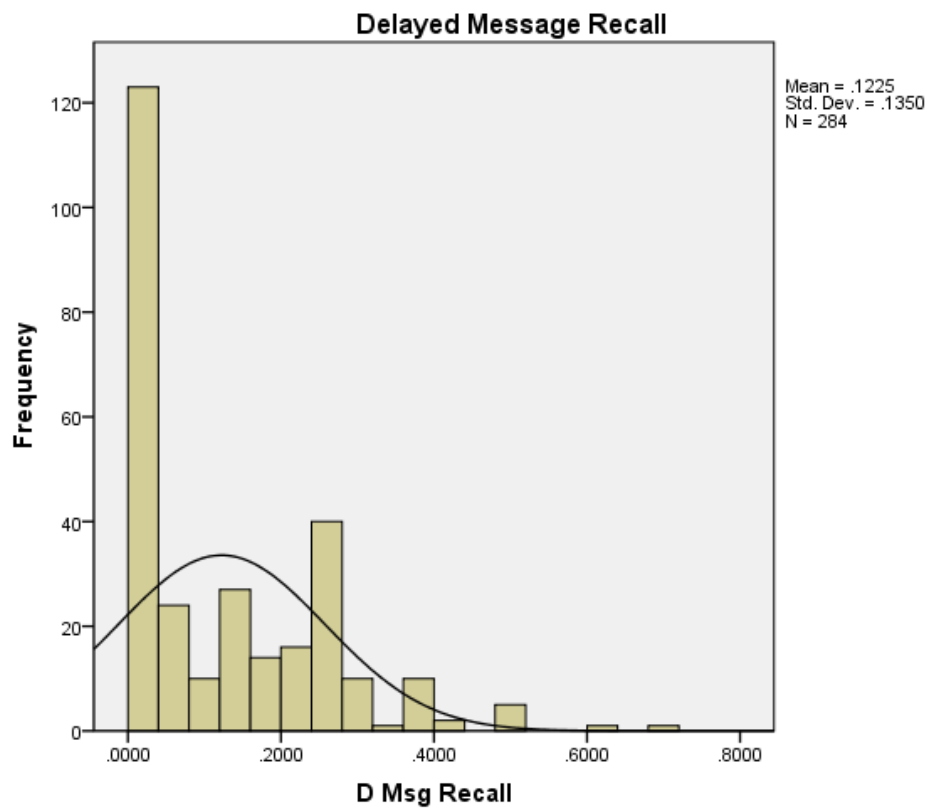
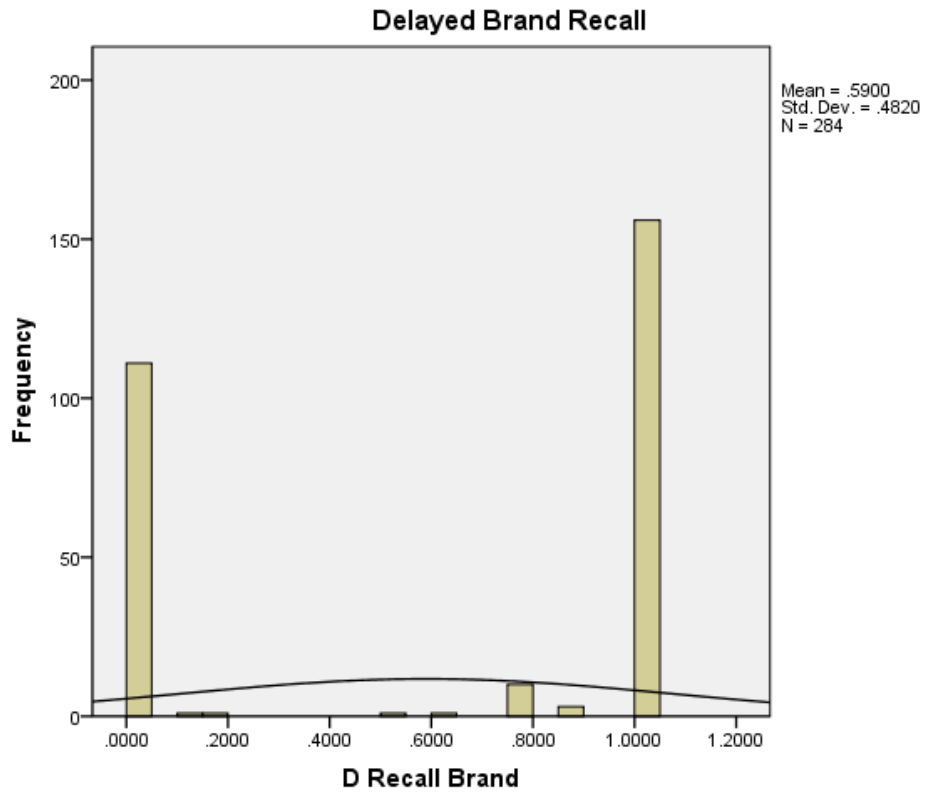
APPENDIXES 9



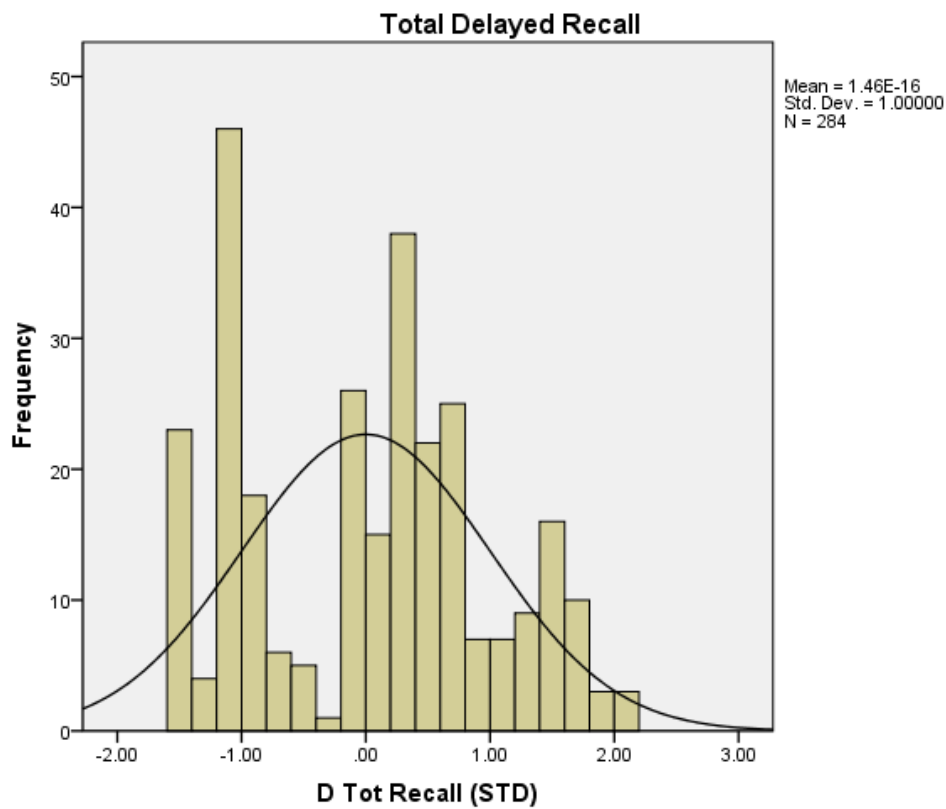
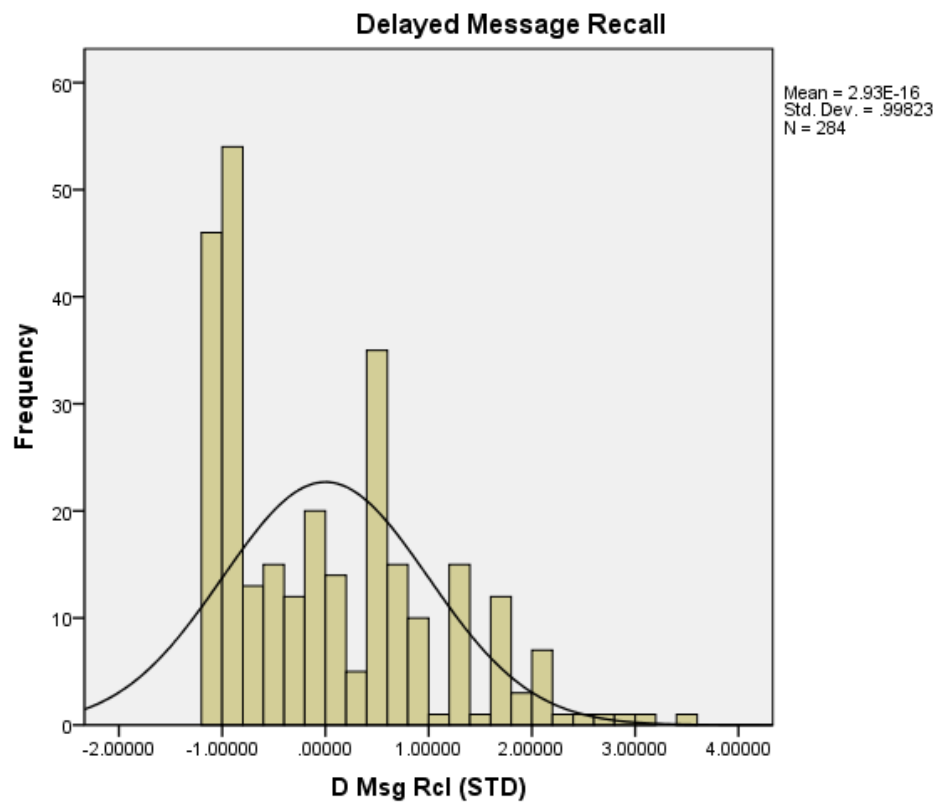
APPENDIXES 9



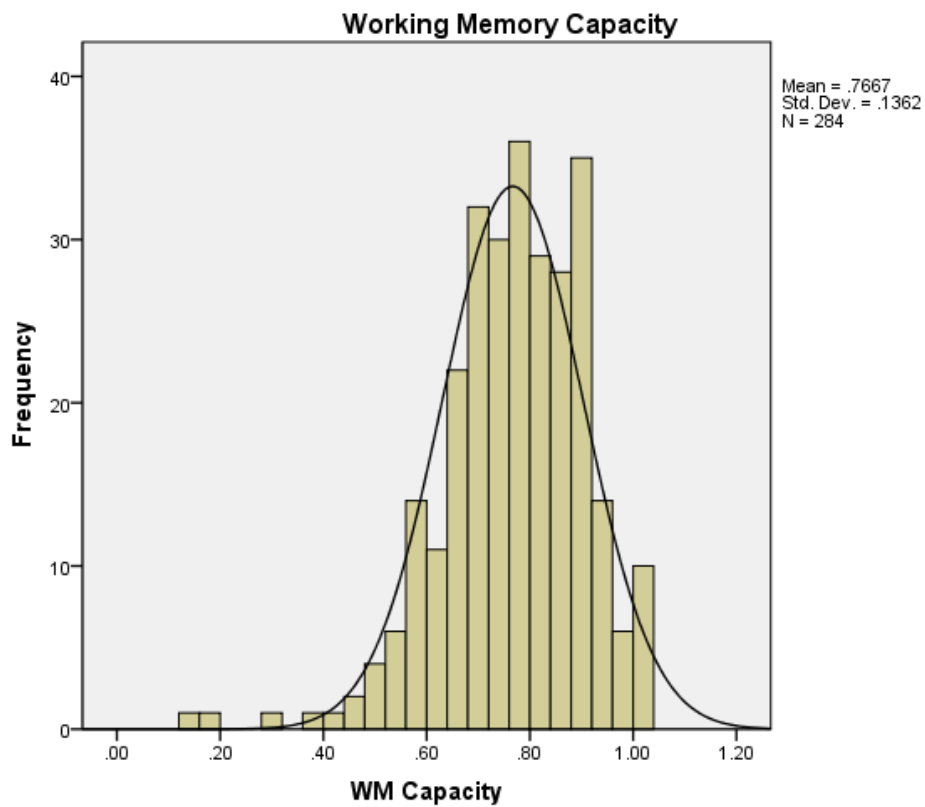
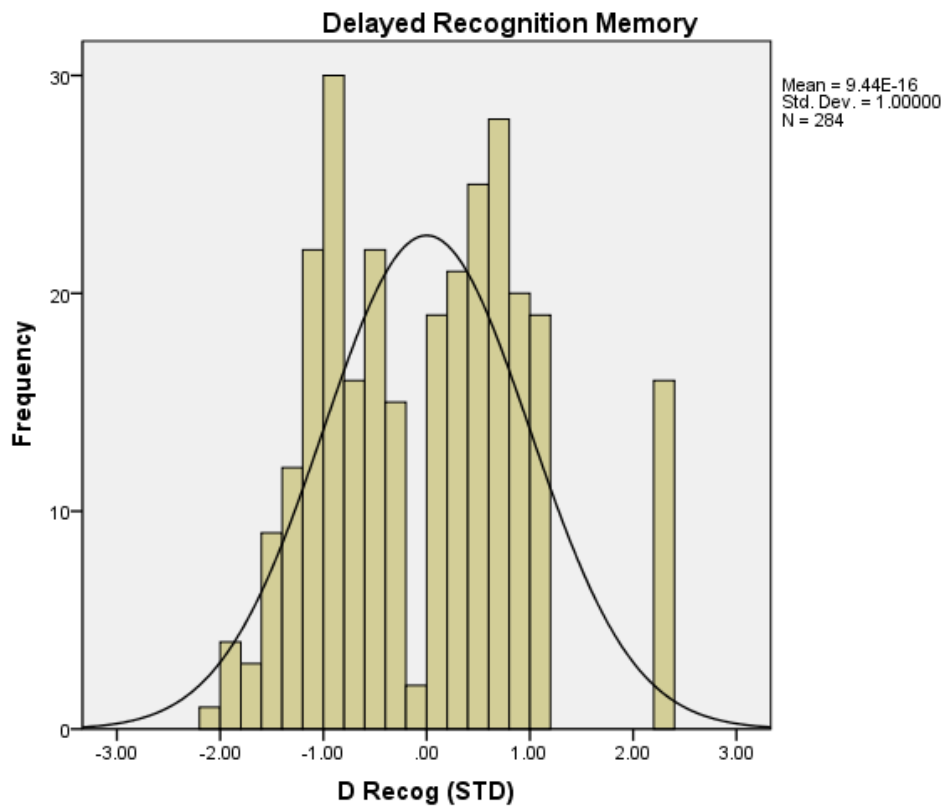
APPENDIXES 9



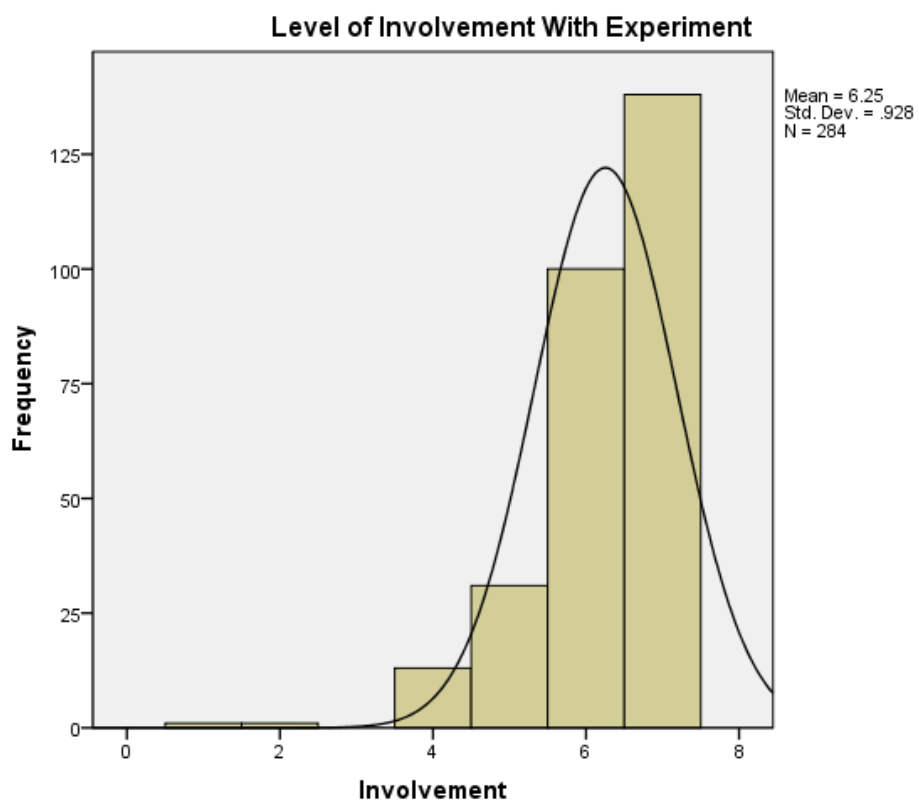
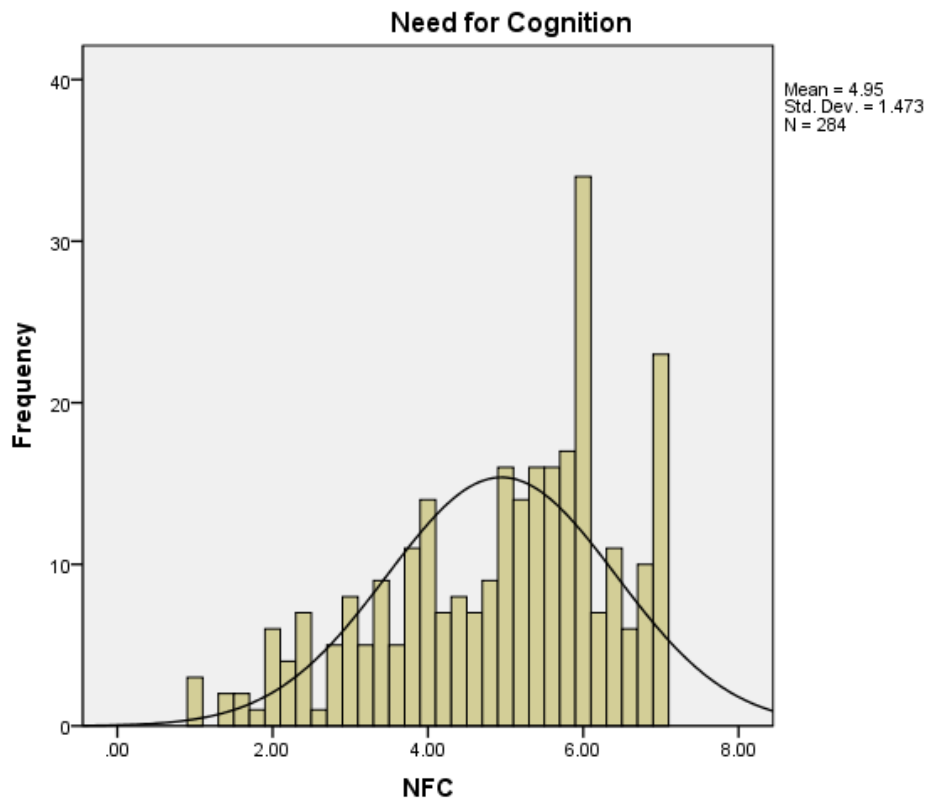
APPENDIXES 9



APPENDIXES 9



APPENDIXES 9



APPENDIX 10: ADDITIONAL ANALYSIS

Description of the Appendix –

This appendix presents additional analysis to support some parts of the discussion.

1. Regression analysis of Psychological Discomfort effect of Cognitive Load
2. Results of the Involvement with Experiment
3. Psychological Discomfort wise Cognitive Load Effect on Attitude towards Advertisement
4. Complexity Effect on Psychological Discomfort

APPENDIXES 10.1

APPENDIX 10.1: REGRESSION ANALYSIS OF PSYCHOLOGICAL DISCOMFORT EFFECT OF COGNITIVE LOAD

Hierarchical multiple regression was undertaken as an additional analysis for testing hypothesis 2. Consequently, two covariates described (Need for Cognition and Working Memory Capacity) were entered into the model as the first block of variables followed by the perceived measures of the message complexity, music congruence, and Psychological Discomfort as the second block (independent variables). Cognitive Load was entered as the response variable of the model and the result is shown in Table A10-1.

Table A10-1- Results of Hierarchical Multiple Regression Analysis for Cognitive Load

	Cognitive Load	
	Standardised β	Sig.
<i>Stage One (Covariates)</i>		
Need For Cognition	0.01	.73
Working Memory Capacity	-0.06	.07
<i>Stage Two (Predictors)</i>		
Perceived Music Congruence	-0.19	.00
Perceived Message Complexity	0.54	.00
Psychological Discomfort	0.26	.00
<i>Overall R^2</i>	0.68	
<i>F</i>	211.13	.00
<i>df</i>	5	

APPENDIXES 10.2

APPENDIX 10.2: RESULTS OF THE INVOLVEMENT WITH EXPERIMENT

In order to determine the participants' level of Involvement with Experiment, one sample t-test was carried out. Since the scale was anchored 1 to 7, middle point 4 was considered as the cut-point for the test. Descriptive statistics of the variable is presented in Table A10-2 and the result of the t-test is presented in Table A10-3. Furthermore, the distribution is also shown in Figure A10-1.

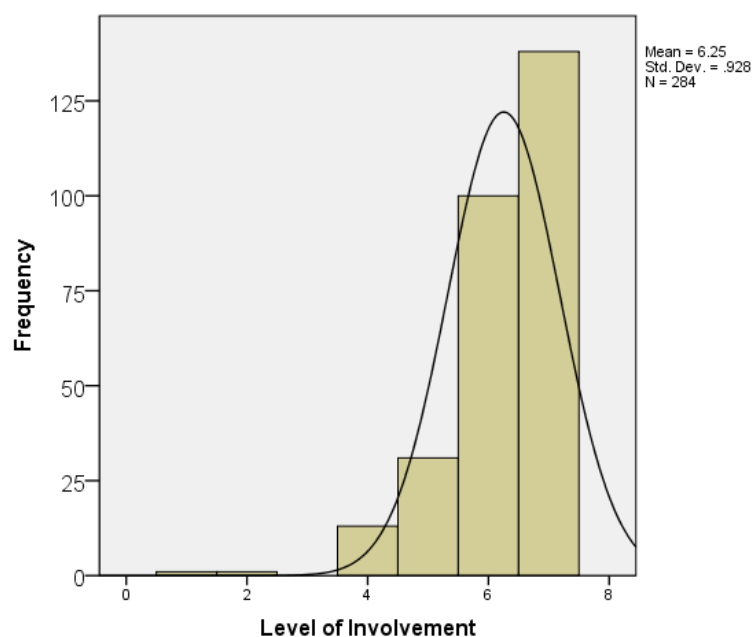
Table A10-2 - Descriptive Statistics of Involvement

Description	Value
Mean	6.25
Std. Dev	0.93
Median	6.00

Table A10-3 – Results of the t-Test

Description	Value
t value	40.92
df	283
<i>p</i>	.00

Figure A10-1 – Histogram of Involvement



APPENDIXES 10.3

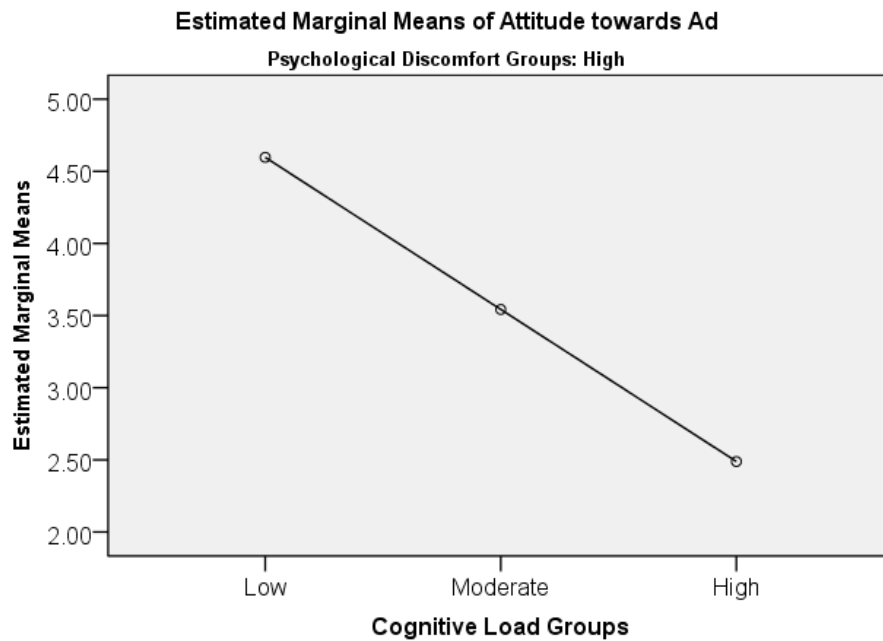
APPENDIX 10.3: PSYCHOLOGICAL DISCOMFORT WISE COGNITIVE LOAD EFFECT ON ATTITUDE TOWARDS ADVERTISEMENT

Psychological Discomfort Level – High

Dependent Variable: ATT

(I) Load Groups	(J) Load Groups	Mean Difference (I-J)	Std. Error	Sig. ^c
Low	Moderate	1.054 [*]	.422	.041
	High	2.108 [*]	.395	.000
Moderate	Low	-1.054 [*]	.422	.041
	High	1.054 [*]	.281	.001

c. Adjustment for multiple comparisons: Sidak.



Covariates appearing in the model are evaluated at WM Capacity = .75, NFC = 4.91

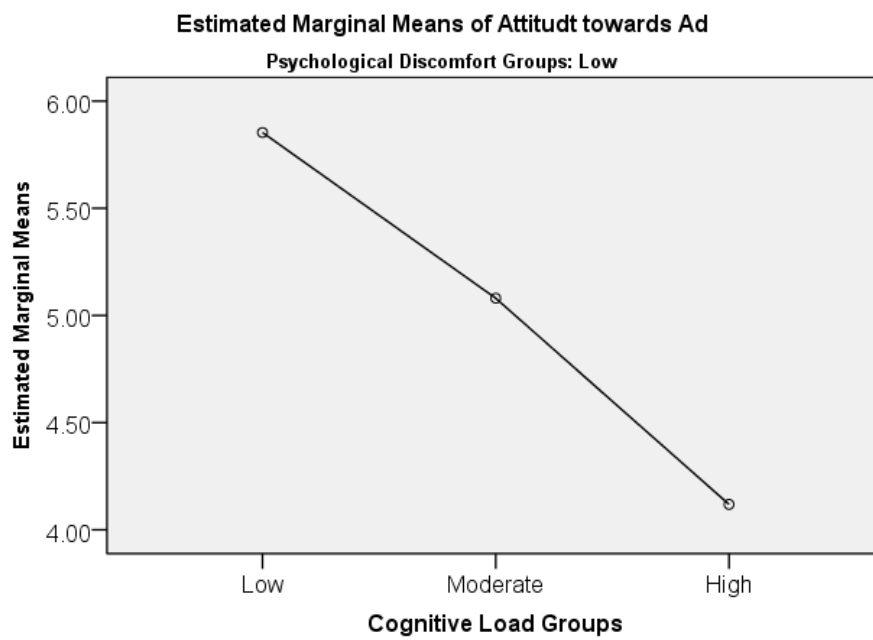
APPENDIXES 10.3

Psychological Discomfort Level – Low

Dependent Variable: ATT

(I) Load Groups	(J) Load Groups	Mean Difference (I-J)	Std. Error	Sig. ^c
Low	Moderate	.773 [*]	.219	.002
	High	1.735 [*]	.297	.000
Moderate	Low	-.773 [*]	.219	.002
	High	.962 [*]	.318	.009

c. Adjustment for multiple comparisons: Sidak.



Covariates appearing in the model are evaluated at WM Capacity = .78, NFC = 4.98

APPENDIXES 10.4

APPENDIX 10.4: Complexity Effect on Psychological Discomfort

ANCOVA was carried out to test the effects of Message Complexity on Psychological Discomfort

Tests of Between-Subjects Effects

Dependent Variable: Psychological Discomfort

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Working Memory Capacity	6.509	1	6.509	3.072	.081
NFC	.362	1	.362	.171	.680
Message Complexity	7.337	1	7.337	3.462	.064
Music Congruence	116.098	1	116.098	54.787	.000
Error	589.105	278	2.119		
Total	3460.556	284			
Corrected Total	719.316	283			

a. R Squared = .181 (Adjusted R Squared = .166)

APPENDIX 11: CODES OF THE COMPUTER PROGRAMMES

Description of the Appendix –

This appendix presents the codes that were written for this study to obtain the following scores for individuals.

1. Recognition Sensitivity Calculator using Signal Detection Framework.
2. Working Memory Capacity Calculator.

APPENDIX 11.1: Recognition Sensitivity Calculator using Signal Detection Framework

'RECOGNITION SENSITIVITY CALCULATOR

'Copyrights B. Leelanga Dananjaya Seneviratne

'Recognition Sensitivity Calculator global variables

```
Private IMMEDIATE_WLIST_ As Rec_RANGE
Private IMMEDIATE_CLIST_ As Rec_RANGE
Private DELAY_WLIST_ As Rec_RANGE
Private DELAY_CLIST_ As Rec_RANGE
```

'Data sheet ranges

```
Private DATA_IMMEDIATE_WLIST_ As Range
Private DATA_IMMEDIATE_CLIST_ As Range
Private DATA_DELAY_WLIST_ As Range
Private DATA_DELAY_CLIST_ As Range
```

```
Type Rec_RANGE
    Simple As Range
    Complex As Range
End Type
```

**Private Function getRecScore(Data_Rng As Range, Ans_Rng As Range,
Optional HROnly = False) As Single**

```
Dim Hit_Rate As Single
Dim FA_Rate As Single
Dim Miss_Rate As Single
Dim CR_Rate As Single
Dim Cel
Dim N As Byte
Dim Hits, Misses, FAs, CRs As Integer
Dim SR_D, SC_D As Long
Dim SR_A, SC_A As Long
Dim Dat, Ans As Byte
```

```
SR_D = Data_Rng.Row: SC_D = Data_Rng.Column
SR_A = Ans_Rng.Row: SC_A = Ans_Rng.Column
```

```
For Each Cel In Ans_Rng
    N = N + 1
    Ans = Cel.Value
    Dat = Data_Rng.Cells(1, N).Value
    Debug.Print "Ans=" & Ans & ": Dat=" & Dat
    Select Case Ans
        Case 0: 'Lure
            GoTo NFor
        Case 1: 'Signal
            If Dat = 1 Then Hits = Hits + 1 Else Misses = Misses + 1

        Case 2: 'Noise
            If Dat = 2 Then CRs = CRs + 1 Else FAs = FAs + 1
```

APPENDIXES 11.1

```

End Select

NFor:
Next
Hit_Rate = Round(Hits / (Hits + Misses), 3)
FA_Rate = Round(FAs / (FAs + CRs), 3)
Debug.Print "HR=" & Hit_Rate & ": FAR=" & FA_Rate
getRecScore = IIf(HROnly, Hit_Rate, get_dPrime(Hit_Rate, FA_Rate,
(Hits + Misses)))
End Function

Private Function get_dPrime(ByVal HRate As Single, ByVal FARate As
Single, N As Byte) As Single
If HRate <= 0 Then HRate = 0.5 / N
If HRate >= 1 Then HRate = (N - 0.5) / N
If FARate <= 0 Then FARate = 0.5 / N
If FARate >= 1 Then FARate = (N - 0.5) / N

get_dPrime = WorksheetFunction.Norm_S_Inv(HRate) -
WorksheetFunction.Norm_S_Inv(FARate)

End Function

Public Function Lee_RecognitionSensitivity(WordList As Range,
MsgList As Range, Simp_or_Comp As Byte,
CalMethod_WordOnly_ClameOnly_Both As Byte, Immediate As
Boolean, Optional HitRateOnly = False) As Single

Dim CalMethod As Byte

'CalMehtos --> 1 = wordlist only, 2= Message List only, 3 = both
CalMethod = CalMethod_WordOnly_ClameOnly_Both

'====initilistion===== SHOULD CHANGE IF THE ANSWERS CHANGE IN
THE ANS WORKSHEET
With Worksheets("rec_ans")
Set IMMEDIATE_WLIST.Simple = .Range("F4:F13")
Set IMMEDIATE_CLIST.Simple = .Range("B4:B15")
Set IMMEDIATE_CLIST.Complex = .Range("C4:C15")
Set DELAY_WLIST.Simple = .Range("M4:M13")
Set DELAY_CLIST.Simple = .Range("I4:I15")
Set DELAY_CLIST.Complex = .Range("J4:J15")
End With
'=====
If Simp_or_Comp = 1 Then
Select Case CalMethod 'SIMPLE
Case 1 'Word list only
Lee_RecognitionSensitivity = getRecScore(WordList,
IIf(Immediate, IMMEDIATE_WLIST.Simple, DELAY_WLIST.Simple),
HitRateOnly)
Case 2 ' Message list only
Lee_RecognitionSensitivity = getRecScore(MsgList,
IIf(Immediate, IMMEDIATE_CLIST.Simple, DELAY_CLIST.Simple),
HitRateOnly)

Case 3 'Both

```

APPENDIXES 11.1

```
        Lee_RecognitionSensitivity = getRecScore(Union(WordList,
MsgList), IIf(Immediate, _

        Union(IMEDIATE_WLIST_.Simple, IMMEDIATE_CLIST_.Simple), _
                Union(DELAY_WLIST_.Simple,
        DELAY_CLIST_.Simple)), HitRateOnly)

    End Select
ElseIf Simp_or_Comp = 2 Then
    Select Case CalMethod 'COMPLEX
        Case 1 'Word list only
            Lee_RecognitionSensitivity = getRecScore(WordList,
IIf(Immediate, IMMEDIATE_WLIST_.Simple, DELAY_WLIST_.Simple),
HitRateOnly)
        Case 2 ' Message list only
            Lee_RecognitionSensitivity = getRecScore(MsgList,
IIf(Immediate, IMMEDIATE_CLIST_.Complex, DELAY_CLIST_.Complex),
HitRateOnly)

        Case 3 'Both
            Lee_RecognitionSensitivity = getRecScore(Union(WordList,
MsgList), IIf(Immediate, _

            Union(IMEDIATE_WLIST_.Simple, IMMEDIATE_CLIST_.Complex), _
                    Union(DELAY_WLIST_.Simple,
            DELAY_CLIST_.Complex)), HitRateOnly)

    End Select
Else
    Lee_RecognitionSensitivity = 999

End If
'Lee_RecognitionSensitivity = IIf(Lee_RecognitionSensitivity < 0,
    0, Lee_RecognitionSensitivity)
```

End Function

```
Private Function getTotAnsRange(WLRange As Range, MSGRange As Range)
As Range
```

```
    Set getTotAnsRange = Union(WLRange, MSGRange)
```

```
End Function
```


APPENDIX 11.2: Working Memory Capacity Calculator

'WORKING MEMORY CAPACITY CALCULATOR

'Copyrights B. Leelanga Dananjaya Seneviratne

```
'WM Calculator global variables
Private STARTCOL_ As Integer ' Starting position of the list in the
    datasheet
Private CURRENTROW_ As Integer ' Current row position
Private SCORING_PRO_ As Byte ' 1=partial-credit UNIT scoring;
    2=all-or-nothing credit UNIT scoring; 3=partial-credit LOAD
    scoring; 4=all-or-nothing LOAD scoring
Private NOWORDSETS_ As Byte ' Total number of word sets in the test
Private LENFIRSTSET_ As Byte 'Number of words in the first set
Private SETSPEC_ As String 'Sets that are included in this test
```

Public Function Lee_wmTestScore(ScelPos As Range, Optional ScoreR = 1) As Single

```
'ScelPos --> cell of the first word label appear. This is not the
    position of the first word entered
NOWORDSETS_ = 10 'Number of sets covered in ans sheet. If the test
    skips some sets, they still needed to be included in this
    number
LENFIRSTSET_ = 3 'number of words in the first set
SETSPEC_ = "3,5,7" 'the sets that are included in this test

Debug.Print vbNewLine & "=====New
    Subject=====New"
STARTCOL_ = ScelPos.Column
CURRENTROW_ = ScelPos.Row
SCORING_PRO_ = ScoreR '1=partial-credit UNIT scoring; 2=all-or-
    nothing credit UNIT scoring; 3=partial-credit LOAD scoring;
    4=all-or-nothing LOAD scoring
Lee_wmTestScore = getTestScore
End Function
```

Private Function getSet(LLen As Integer, LNo As Integer) As Variant **'returns an array of word set**

```
Dim sPos As Byte
Dim N As Byte
Dim wordSet() As String

For N = 3 To LLen - 1
    sPos = sPos + N * 2
Next N

sPos = sPos + LLen * (LNo - 1) + 1
ReDim wordSet(1 To LLen) As String
With Worksheets("wordlist")
    For N = sPos To (sPos + LLen) - 1
        wordSet(N - sPos + 1) = UCase(Trim(.Cells(N, 1).Value))
    Next N
End With
```

APPENDIXES 11.2

```
getSet = wordSet
End Function

Private Function getTestScore() As Single
    Dim LNo As Integer
    Dim R As Integer
    Dim N As Byte
    Dim Pos As Integer
    Dim CPos As Integer
    Dim pList() As String
    Dim curRating As Single

    R = 2
    CPos = STARTCOL_ - 1
    'LNo = 2 '(length of the starting word set) -1
    LNo = LENFIRSTSET_ - 1

    For N = 1 To NOWORDSETS_ ' total number of word sets in the test
        LNo = LNo + N Mod 2
        If InStr(1, SETSPEC_, CStr(LNo), vbTextCompare) < 1 Then GoTo NR
        CPos = CPos + getOffset(LNo)
        ReDim pList(1 To LNo)
        For R = 1 To LNo
            pList(R) = UCase(Trim(ActiveSheet.Cells(CURRENTROW_, CPos +
                R).Value))
        Next R
        CPos = CPos + LNo
        curRating = curRating + compareList(getSet(LNo, 1 + (N + 1) Mod
            2), pList)
    NR:
    Next N

    Select Case SCORING_PROC_
        Case 1, 2: '1=partial-credit UNIT scoring; 2=all-or-nothing
            credit UNIT scoring;
                getTestScore = curRating / 6
        Case 3, 4: ' 3=partial-credit LOAD scoring; 4=all-or-nothing
            LOAD scoring
                getTestScore = curRating / 30
    End Select
End Function

Private Function getOffset(SLen As Integer) As Integer
    getOffset = SLen + 4 * SLen
End Function

Private Function compareList(OrgList, ParList) As Single
    Dim N As Byte
    Dim Score As Single
    Dim Ts As Single

    Debug.Print vbNewLine & "-----New Word Set-----"

    For N = 1 To UBound(OrgList, 1)
        Debug.Print OrgList(N) & " = " & ParList(N)
```

APPENDIXES 11.2

```
If OrgList(N) = ParList(N) Then Score = Score + 1
Next N
```

```
Select Case SCORING_PROC_
  Case 1:
    compareList = Score / UBound(OrgList, 1)
  Case 2:
    If Score < UBound(OrgList, 1) Then
      compareList = 0
    Else
      compareList = 1
    End If
  Case 3:
    compareList = Score
  Case 4:
    If Score < UBound(OrgList, 1) Then
      compareList = 0
    Else
      compareList = Score
    End If
End Select
```

End Function